

mineral resources

Department: Mineral Resources **REPUBLIC OF SOUTH AFRICA**

DRAFT

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT (PART B)

FOR SHONDONI COLLIERY

DATE JUNE 2021

DMRE REFERENCE NUMBER:

MINING RIGHT MP 30/5/1/2/3/2/1/138 MR

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT:	Sasol Mining (Pty) Ltd – Shondoni Colliery		
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IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process—

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) determine the—-

(i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and

(ii) degree to which these impacts—

- (aa) can be reversed;
- (bb) may cause irreplaceable loss of resources, and
- (cc) can be avoided, managed or mitigated;

(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

(g) identify suitable measures to manage, avoid or mitigate identified impacts; and

(h) identify residual risks that need to be managed and monitored.

PART B ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SASOL MINING (PTY) LTD – SHONDONI COLLIERY



JUNE 2021



Purpose of Report

In order to facilitate the management of a decommissioning mine and an operational mine, Sasol Mining wants to separate the current approved 2011 integrated EMP report/ document into two separate management programmes. One for the Middelbult Colliery (decommissioning mine) and one for the Shondoni Colliery (operational mine). This project will focus on the operations of Shondoni Colliery and all the related current and proposed activities. Sasol Mining's Shondoni Colliery wishes to expand its operations to a new Block 8 North Reserve Area. This will require that four prospecting rights be included in the larger mining right (MP 30/5/1/2/3/2/1/138 MR) applicable to the coal reserve area. To ensure sufficient ventilation for the underground mine workings, four new ventilation shafts will be required in the north and north-west region of the Shondoni Colliery project area.

The proposed project requires Environmental Authorisation (EA) in terms of the provisions of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002; MPRDA), the National Environmental Management Act (Act No. 107 of 1998; NEMA) as well as the National Water Act (Act No. 36 of 1998; NWA). Based on the nature of the proposed activities at Shondoni Colliery, the necessary applications have to be supported *inter alia* by a Scoping and Environmental Impact Assessment and Reporting (S&EIR) Process as provided for in the 2014 Environmental Impact Assessment (EIA) Regulations (GNR 326 of 07 April 2017), as amended.

In view of the fact that Shondoni Colliery operates as a mine, the administrative process is that of the "Single Environmental System" with the Department of Mineral Resources and Energy (DMRE) being the Competent Authority (CA) for the EA Application. The DMRE has developed Reporting Templates in support of the "Single Environmental System", (Scoping Report, Basic Assessment Report, Environmental Impact Assessment Report as well as Environmental Management Programme Report), with strict instructions and content requirements. The DMRE Templates essentially represent a summary by the Environmental Assessment Practitioner (EAP) of more comprehensive information and requires that supporting details be provided as Appendices to the DMRE Template Report. This Draft EMPr emulates the DMRE Template for **Part B** – Environmental Management Programme Report and is presented in conjunction with the Part A - Scope of Assessment and Environmental Impact Assessment Report.

Report Reference Numbers JMA Project: JMA/10516 JMA Report: Prj6404 DMRE Ref: MP 30/5/1/2/3/2/1/138 MR

> **Report Status** Draft for I&AP Review

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DOCUMENT APPROVAL RECORD

REPORT TITLE	Sasol Mining (Pty) L	Sasol Mining (Pty) Ltd Shondoni Colliery Draft EMPr				
PROJECT NUMBER	JMA/10516	REPORT NUMBER Prj6404		REVISION NUMBER	01	
REPORT STATUS	Draft		DATE	June 2021		
PREPARED BY:						
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				Original signed b	<i>y</i>	

REPORT REVISION AND ISSUE REGISTER

REV. NO.	ISSUED TO	ISSUED BY	DATE ISSUED	FORMAT	NO. OF COPIES

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LIST OF APPENDICES

APPENDIX 3(A) : Large Scale Composite Site Layout Map





LIST OF ABBREVIATIONS AND ACRONYMS

AMD	:	Acid Mine Drainage
BPEO	:	Best Practicable Environmental Option
CA	:	Competent Authority
CBA	:	Critical Biodiversity Areas
CPIX	:	Consumer Price Index
CV	:	Curriculum Vitae
DMRE	:	Department of Mineral Resources and Energy
DWS	:	Department of Water and Sanitation
EA	:	Environmental Authorisation
EAP	:	Environmental Assessment Practitioner
EAPASA	:	Environmental Assessment Practitioners Association of South Africa
EIA	:	Environmental Impact Assessment
EIAR	:	Environmental Impact Assessment Report
EMP	:	Environmental Management Plan
EMPr	:	Environmental Management Programme Report
FRAI	:	Fish Response Assessment Index
FY	:	Financial Year
GNR	:	Government Notice Report
HCR	:	Habitat Cover Rating
I&AP's	:	Interested and Affected Parties
IHI	:	Index of Habitat Integrity
ISO	:	International Organization for Standardisation
IWWMP	:	Integrated Water and Waste Management Plan
km	:	kilometer
m	:	meter
MHSA	:	Mine Health and Safety Act (Act No. 29 of 1996)
MIRAI	:	Macroinvertebrate Response Assessment Index
mm	:	millimeter
MPRDA	:	Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)
NAAQS	:	South African National Ambient Air Quality Standard
NDCR	:	National Dust Control Regulations
NEMA	:	National Environmental Management Act (Act No. 107 of 1998)
NEMBA	:	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEMWA	:	National Environmental Management: Waste Act (Act No. 59 of 2008)
NWA	:	National Water Act (Act No. 36 of 1998)
PCD	:	Pollution Control Dam
P&G	:	Preliminary and General
PPI	:	Producer Price Index
RQO	:	Resource Quality Objectives
RSIP	:	Rehabilitation Strategy and Implementation Plan
SACNASP	:	South African Council for Natural Scientific Professions
SAHRA	:	South African Heritage Resources Agency
SANBI	:	South African National Biodiversity Institute
SANS	:	South African National Standard
SASS5	:	South African Scoring System
SCC	:	Species of Conservational Concern
S&EIR	:	Scoping and Environmental Impact Reporting
SEP	:	Stakeholder Engagement Process
SHE	:	Safety, Health and Environment
SLP	:	Social and Labour Plan
VOC	:	Volatile Organic Compound



LIST OF ABBREVIATIONS AND ACRONYMS

Water Quality Objectives Water Use Licence WQO :

WUL :



EXECUTIVE SUMMARY

This section will be attended to once the EIA Public Participation has been completed





1. DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

1.1. DETAILS OF THE EAP WHO PREPARED THE REPORT

Table 1.1(a): Details of the Environmental Assessment Practitioner (EAP)

Project Consultancy	JMA Consulting (Pty) Ltd
Company Registration	2005/039663/07
Professional Affiliation	Environmental Assessment Practitioners Association of South Africa (EAPASA - EAP 2019/943); South African Council for Natural Scientific Professions (SACNASP – Pr.Sci.Nat. 400291/12)
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1.2. EXPERTISE OF THE EAP

The Environmental Assessment Practitioner (EAP) for this project was Ms René Wolmarans (Pr. Sci. Nat.).

1.2.1. Qualifications of the EAP

René Wolmarans holds the following degrees:

- B.Sc. from the University of Pretoria (2006) with major subjects in Ecology.
- B.Sc. (Hons) from the University of Pretoria (2007) with field of specialisation Ecology (Invasion Biology).
- M.Sc. (cum laude) from the University of Pretoria (2010) with field of specialisation Ecology (Invasion Biology).

René Wolmarans is registered as an Environmental Assessment Practitioner (EAP 2019/943) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) in accordance with the prescribed criteria of Regulation 15(1) of the Section 24H Registration Authority Regulations (Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the NEMA, Act No. 107 of 1998, as amended).

In addition, she holds a Professional Registration with South African Council for Natural Scientific Professions (SACNASP) since 2012 – 400291/12. She is registered as a professional scientist in the following category:

• Ecological Science



1.2.2. Past Experience of the EAP

René Wolmarans started her working career as an Intern at the South African National Biodiversity Institute (SANBI) Threatened Biodiversity Research Programme followed by being employed as an Environmental Practitioner at Clean Stream Scientific Services.

She was appointed as a Scientist at JMA Consulting (Pty) Ltd in 2012 and has been responsible for the compilation of Basic Assessment Reports, Scoping and Plan of Study Reports, Environmental Impact Assessment Reports (EIAR) and Environmental Management Programme (EMPr) Reports.

Subsequently, she is also assisting with the development of Integrated Water and Waste Management Plans (IWWMP) and External Audit Reports on Water Use Licences (WUL) and Waste Management Licences (WML). In addition, she facilitates the Stakeholder Engagement Programmes as required by Environmental Management Legislation.

1.3. CV OF THE EAP

A Synoptic CV of the EAP is attached as **APPENDIX 1(A)** to this report.



2. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

This Draft EMPr is compiled to serve two purposes:

- Firstly to serve as a management plan for the proposed activities at Shondoni Colliery for which authorisation is applied for; and
- Secondly it represents the combined and consolidated draft EMPr for the operational mine Shondoni Colliery (current and proposed activities), which has been separated from the decommissioning Middelbult Colliery.

In order to support these objectives, both the EIAR (Part A) as well as the draft EMPr (Part B) deals comprehensively with both, current activities at Shondoni Colliery (which have already been authorised), as well as with the proposed activities for which authorisation is now required/ applied for.

The description of the Aspects of all the current as well as the proposed activities was derived through a structured process during the compilation of the EIAR (Part A) in order to ensure that the resulting EMPr is comprehensive and therefore provides for the management and mitigation of all significant impacts associated with Shondoni Colliery. It is herewith confirmed that this process is described in detail in Chapter 8 of the EIAR (Part A).

In short the Aspects were identified and described as follows:

- The entire Shondoni Colliery operations, comprising both the activities at the Shondoni Shaft Complex and the Simunye Shaft Complex, was identified and described in detail (see Section 4.4 and 4.5 of the EIAR Part A).
- Proposed activities were also identified and the detail determined (a description is provided in section 4.6 of the EIAR Part A).
- The EAP then assessed each activity in order to identify aspects related to that activity that could potentially cause environmental impacts.
- The end result was a Table comprising three columns:
 - Column 1: Specific **Activities** (current and proposed) occurring at Shondoni Colliery that could potentially have an environmental impact.
 - Column 2: **Aspects** associated with the Activity. Aspects were provisionally identified by the EAP and was verified with the relevant specialists assessing the different environmental components. Aspects are defined as the mechanisms by which the project activities impact on receptors (e.g. people, economy, infrastructure, institutions and natural environment).
 - Column 3: **Environmental Components** that will be impacted on by the specific aspect during a specific project phase (Construction Phase, Operational Phase and Decommissioning Phase).

The outcome of this exercise is shown in Table 2(a). This Table forms the basis from which the Impacts were then identified and described and upon which both the Impact Assessment as well as the Management Plan are based.



Activity Aspect		Environmental Component				
	Shondoni Shaft Complex					
Access Roads	Road Surface, Road Verge	Soils, Groundwater, Surface Water, Plant Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Security Fence and Access	Fences and Booms	Surface Water, Animal Life, Aquatic Ecosystems, Wetlands Air Quality, Noise, Visuals				
Offices, Workshops and Changehouses	Building Material	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Internal Roads and Parking Areas	Road Surface, Road Verge	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Electricity Supply	Substations, Overhead Power Lines	Surface Water, Animal Life, Plant Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Fuel & Oil Storage	Tanks	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Explosives Off-Load Area	Off-Load Footprint Area	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Man and Material Shaft Infrastructure	Decline Shafts, Conveyors	Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Conveyor System	Conveyors	Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Ventilation Shaft	Building Material, Fans	Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Underground Mining Acid Mine Drainage (AMD)		Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise Visuals				
Topsoil/ Overburden Stockpile	Stockpile Footprint	Topography, Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Coal Storage in Surface Bunker	Building Material, Storage Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Emergency Throw-Out Area and Stockpile	Stockpile Footprint	Topography, Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Stonedust Dump	Dump Footprint	Topography, Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Potable Water Supply System	Pumping of Potable Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Potable Water Reservoir	Reservoir Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Shondoni PCD & Shondoni Incline PCD	Storage of Process/ Service Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				
Surface Service Water Reservoir	Reservoir Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals				

Table 2(a): Activity and Aspect Table to be assessed during the Environmental Impact Assessment



Activity	Aspect	Environmental Component		
Service Water Reticulation System	Pumping of Service Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Storm Water Berms and Reduction of Runoff to Canals Natural Resource		Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Attenuation Dam/ Structure	Reducing the Velocity of Storm Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Oil and Silt Traps	Storage of Oil and Silt	Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Sewage Treatment Plant	Sludge Drying Beds	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Iso Yard (Temporary storage of general, domestic and industrial waste)	Yard Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Iso Yard (Temporary storage of hazardous waste)	(Temporary of hazardous Yard Footprint Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals			
Capital Yard (Temporary storage of scrap metal) Yard Footprint		Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
		Simunye Shaft		
Access Roads	Road Surface, Road Verge	Soils, Groundwater, Surface Water, Plant Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Security Fence and Access	Fences and Booms	Surface Water, Animal Life, Aquatic Ecosystems, Wetlands Air Quality, Noise, Visuals		
Offices, Workshops and Changehouses	Building Material	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Internal Roads and Parking Areas	Road Surface, Road Verge	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Electricity Supply	Substations, Overhead Power Lines	Surface Water, Animal Life, Plant Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Fuel Storage	Tanks	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Man and Material Shaft Infrastructure	Decline Shafts, Conveyors	Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Ventilation Shaft	Building Material, Fans	Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Underground Mining	Surface Subsidence, Gas Accumulation, Generation of AMD	Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		
Topsoil/ Overburden Stockpile	Stockpile Footprint	Topography, Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals		



Activity	Aspect	Environmental Component	
Stonedust Dump	Dump Footprint	Topography, Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
Potable Water Supply System	Pumping of Potable Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
Potable Water Reservoir	Reservoir Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
Service Water Dam (Top & Bottom)	Storage of Process/ Service Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
Service Water Reticulation System	Pumping of Service Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
Storm Water Berms and Canals	Reduction of Runoff to Natural Resource	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
Sewage Treatment Plant	Sludge Drying Beds	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
Storage Yard (Temporary storage of general, domestic and industrial waste)		Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
Storage Yard (Temporary storage of hazardous Yard Footprint waste)		Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
		Proposed Activities	
Underground Mining	Surface Subsidence, Gas Accumulation, Generation of AMD	Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
West Upcast VentilationBuilding Material, Fans,ShaftAccess Road		Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
West Downcast Ventilation Shaft	Building Material, Fans, Access Road	Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
North Upcast Ventilation Shaft	Building Material, Fans, Access Road	Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	
North Downcast Ventilation Shaft	Building Material, Fans, Access Road	Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals	



3. COMPOSITE SITE MAP

The composite site map is attached as **APPENDIX 3(A)** to this draft EMPr. A small scale copy of the map is attached as Figure 3(a) below.

The map consists of the following:

- The proposed locations for the proposed ventilation shafts at Shondoni Colliery were plotted on the map.
- The EAP and the team of environmental specialists then conducted extensive site inspections followed by quantitative baseline studies and then compiled individual environmental features maps for their respective environmental components.
- The EAP compiled a composite map for the entire site, showing all the proposed activities (including the proposed underground mining layout) and environmental features.





Figure 3(a): Composite Site Map showing Shondoni Colliery Activities and Environmental Features



4. DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES

4.1. DETERMINATION OF MANAGEMENT AND CLOSURE OBJECTIVES

The management and closure objectives for the site are informed by the environmental setting and conditions as present on and around the Shondoni Colliery site. The environmental baseline descriptions compiled by the environmental specialists and which is described in section 7.4 of the EIAR (Part A), informs the desired post closure environmental condition.

The management and closure objectives listed for the relevant environmental components in Table 4.1(a) were therefore derived using the pre-mining environmental condition as point of departure, but was formulated subject to recognising, considering and taking cognisance of site specific conditions, the nature of activities, residual impacts post closure and finally the feasibility for the implementation of effective remediation measures.

The objectives listed in columns 2 and 3 of Table 4.1(a) form the basis from which to determine measurable/auditable management objectives during the operational and decommissioning phases and relinquishment criteria in the event that an application for a closure certificate is lodged with the DMRE upon formal decommission and closure of the site.

The following Environmental Components were considered:

- Socio-Cultural and Socio-Economic Aspects
- Archaeology, Heritage and Palaeontology
- Topography
- Soils, Land Capability and Land Use
- Geology and Geochemistry
- Groundwater
- Surface Water
- Terrestrial Ecology (Plant Life & Animal Life)
- Aquatic Ecosystems
- Wetlands
- Air Quality
- Noise
- Visual Aspects



Environmental Component	Management Objective	Post Closure Phase Management Outcomes		
Socio-Cultural/Socio- Economic Environment	Positive community liaisons.	Sustainable Socio-Cultural/ Economic legacy to be visible.		
Archaeological and Heritage Environment	No impact on the heritage resources.	Implement chance find procedure when heritage resources are discovered during post closure phase. Remedy impact on heritage resources (historical remains) by implementing documenting procedure		
Palaeontological Environment	No impact on the palaeontological resources (fossils).	Implement necessary chance find/ rescue operations if fossils are exposed during post closure phase.		
Topography	Minimize alteration to the natural topography in terms of morphology and stability.	Existence of Stable Landforms and Free-Draining Surfaces.		
Soils, Land Capability & Land Use	Soil fertility that allows for stable, self-sustaining vegetation cover.	Soil Fertility that supports end land use.		
Geology and Geochemistry	Minimise disturbance footprint.	Control indirect impacts by identifying surface deformation areas.		
Groundwater Environment	Prevent Contamination of Groundwater Resources. Prevent Depletion of Groundwater Resources.	Groundwater Quality to be Compliant with the Background Groundwater Quality Profile. Groundwater Abstraction to be Compliant with WUL Conditions.		
Surface Water Environment	Prevent contamination of receiving environment. Ensure that clean storm water run-off is free-draining.	Surface water quality to be complaint with resource quality objectives. Ensure no ponding of surface water.		
Plant Life Environment	Stable, self-sustaining indigenous vegetative cover that supports the post closure land use. Absence of invasive alien species.	Audits of species richness and diversity of indigenous species as part of the post-closure monitoring program.		
Animal Life Environment	Stable faunal assemblages.	Audits to confirm effectiveness of the elevation of visibility of overhead transmission lines to reduce the likelihood of birds perching and getting electrocuted through best practice technology.		
Aquatic Ecosystems Environment	Improve the Ecological State of the Waterval River. The Rolspruit should be protected as a refuge area.	Prevent ingress and surface subsidence. Rehabilitate rivers and wetlands to improve flows and water quality in receiving watercourses if necessary.		
Wetland Environment	Avoid and prevent wetland degradation.	Stop uncontrolled decant and treat contaminated water prior to discharge. Rehabilitate areas affected by subsidence.		
Air Quality Environment	Maintain acceptable air quality limits in terms of gaseous emissions, particulate matter emissions and dust-fall-out as specified in the published South African guidelines.	Maintain acceptable air quality limits in terms of gaseous emissions, particulate matter emissions and dust-fall-out as specified in the published South African guidelines		
Noise Environment	Control noise level to comply with SANS 10103 guidelines	Control noise level to comply with SANS 10103 guidelines		
Visual Aspects	Restrict impact on visual aspects.	No residual visible air quality impact. Final landforms to present no visual intrusion within the Surrounding Natural Landscape.		

Table 4.1(a): Management and Closure Objectives as per Environmental Component



4.2. MANAGEMENT OF ENVIRONMENTAL DAMAGE AND PUMPING OF WATER

During bord and pillar mining significant influxes of groundwater to the underground mine will only occur with the intersection of preferential groundwater flow zones, during mining of the coal seams, including dolerite dyke contact zones, dolerite sill contact zones, faults or fissures.

Insufficient information currently exists to accurately delineate all the localities of these flow zones on the coal seam horizons. The magnitude of influxes related to these features seldom cause extensive cones of depression in the groundwater regime. However, the groundwater resources of external users located above the mine-intersected features could be affected.

Monitoring of groundwater levels at external groundwater users may provide information of these impacts occurring.

During the decommissioning phase, final rehabilitation of underground mining sections will take place. The decommissioning activities themselves are not expected to result in additional impacts to the geological or groundwater regimes. In the underground sections, water levels will continue to accumulate, as water will no longer be used as part of the operational phase water management. Estimates for the post closure mine water balance included mine flooding rates as well as post closure decant rates, for both the underground sections. Sources of groundwater in rehabilitated mining sections during post closure include surface decant, groundwater seepage and inter-mine flow.

Measures will be put in place during the decommissioning phase to manage all seepage as part of the post-closure water balance. Measures to manage all groundwater related impacts have been proposed for the operational phase, and these measures must be completed during the decommissioning phase to ensure minimisation of post closure and long-term groundwater impacts.

4.3. POTENTIAL RISK OF ACID MINE DRAINAGE (AMD)

A detailed sampling, analyses and characterization assessment was conducted for Shondoni Colliery, the outcome of which was documented in the Geochemical Assessment Report. This report is attached as APPENDIX 7(L) to the EIAR.

The rate-limiting step for pyrite oxidation in the underground mine workings will be oxygen migration into the underground workings. Oxygen influx will be the highest in unflooded parts of the mine and will be limited in water saturated areas. Increased flooding rates reduces the time during which the pyrite is exposed to oxidizing conditions and hence reduces the potential for acid generation.

Oxygen will be consumed by pyrite as well as by slow reactions with carbonaceous material. Oxygen is also quickly replaced in old underground workings by other gases, for example methane.

The acid-base testing of the material samples taken at Shondoni indicated that under oxidizing conditions, the roof rocks will certainly generate acidic drainage with the sidewall and floor rocks having a low potential to generate acidic drainage.

Numerical geochemical modelling was further employed to determine the generation of Acid Mine Drainage (AMD) in the underground workings.



4.4. INVESTIGATION AND EVALUATION OF AMD IMPACT

The potential impact from AMD will be investigated through an on-going surface water and groundwater monitoring programme aimed at identifying the possible presence of AMD in the water resources.

4.5. ENGINEERING/MINE DESIGN SOLUTIONS TO IMPACTS FROM AMD

Groundwater draining into the mine workings will initially be of a good quality. The pH will be alkaline due to the presence of bicarbonate species. However, once the groundwater reaches the mine, the material that it comes into contact with will influence its quality.

The following sequence of chemical reactions will occur:

- The water seeping into the mine will generally be of good quality, except for suspended solids present. Most, if not all of the water resulting from operations, will be used during the operational phase. Isolated areas of water make can however be present and will drain to the lowest point of the mine.
- The water present will be alkaline, but the Total Dissolved Solids content will increase due to the contact with the coal floor/pillars.
- Groundwater will continue to percolate through the roof downward to the saturated areas. This will lead to the mixing of initially alkaline to neutral groundwater, with relative stagnant, alkaline groundwater on the mined horizon.
- If the current and proposed water management measures are implemented, regional acidification is not expected during the operational phase.

Stratification of waters with differing salinity is a well understood phenomenon, and has been studied and researched in great depth, *inter alia* in studies related to sea-water intrusion in coastal aquifers.

It has been shown in these studies that in the absence of induced hydraulic stresses (e.g. pumping) the actual salinity interface is quite sharp with the diffuse interface zone restricted to a scale of a few meters. This suggests that unless induced hydraulic stresses occur within the flooded mining environment, stratification is most likely to occur, thus effectively containing high salinity waters on the horizons at which they occurred/accumulated.

Therefore, unless hydraulic mechanisms occur, which can transport high salinity waters from the mined horizon, through the overlying saturated formations, onto surface, the high salinity water will most probably stay on the mined horizon.

It should be remembered that in the saturated overlying weathered zone aquifers, groundwater flow will essentially be horizontal, thus preferentially causing surface discharge of recently recharged water from surface.

The probability for the presence/occurrence of non-equilibrium hydraulic stresses in a total extraction mining area could be higher than in conventional bord and pillar mining areas, due to the structural modifications present in such areas. In the end, the mine will have to be assessed on a site-specific basis, as aspects such as depth of mining, presence of dykes and faults, extent of structural disturbance, rate of flooding and inter-connectivity with other mines, may influence the post-closure decant scenario of a particular mine.



4.6. MEASURES TO REMEDY RESIDUAL/CUMULATIVE AMD IMPACTS

Groundwater recharge to underground mining units that remains in reservoirs (water compartments) will come in contact with coal pillars, mine floors and roofs. A gradual deterioration in groundwater quality will take place over time, eventually leading to total acidification of underground mine water.

The deterioration of groundwater in underground water compartments is a given. The migration of polluted groundwater will be avoided by managing the water in underground storage compartments.

Monitoring of the underground groundwater qualities on a quarterly basis is proposed as a measure to eventually remedy the residual/ cumulative AMD impact. Should it be required, excess water from the underground in the total Sasol Mining Right Area, which includes but is not limited to Shondoni Colliery, must be pumped to surface and desalinated.

4.7. WATER USE REQUIREMENTS (VOLUMES/RATES) – WATER BALANCE

The Shondoni Colliery water balance was updated in support of this project.

This water balance incorporates water flows at both the Shondoni and Simunye Shaft Complexes, a full discussion of which is contained in the Surface Water Specialist Report appended to the EIAR – APPENDIX 7(N).

A schematic representation of the Water Balance is given in Figure 4.7(a) and the calculated water balance calculated for average conditions, which provides a general insight into the overall total water use and consumption of the mine is provided in Figure 4.7(b).





Figure 4.7(a): Water Process Flow Diagram - Current (2020) and Future





Figure 4.7(b): Simulated 2020/2021 Water Balance for Average Conditions

4.8. WATER USE LICENCE APPLICATION

A Water Use Licence Application is being prepared and will be formally lodged with the DWS.

The application will be lodged with the DWS Gauteng Region Pretoria Office. A pre-application meeting will be held with officials from this office.

The relevant information will be made available for Public Participation purposes in the same Stakeholder Engagement Process (SEP) as for this EIA/EMPr project.



5. DESCRIPTION OF IMPACT MANAGEMENT MEASURES/ ACTIONS

Tables relaying the impacts and impact management associated with all the life cycle phases of Shondoni Colliery are provided below. In these Tables, a description of the impact management objectives/ outcomes, a description of the proposed management actions, the standards to be achieved and compliance with prescribed and applicable environmental management standards or practices are provided.

Management Measure Tables were compiled, one for each life cycle phase of the activities, aspects and impacts.

- Section 5.1: Construction Phase Impact Management Measures Tables
- Section 5.2: Operational Phase Impact Management Measures Tables
- Section 5.3: Decommissioning and Closure Phase Impact Management Measures Tables
- Section 5.4: Post Closure Phase Impact Management Measures Tables

The Impact Management Measures Tables follow logically on from the Impact Significance Rating Tables in Chapter 9 of the EIAR. Each Table comprises of 9 columns:

- Column 1: Proposed Project Activity
- Column 2: Location
- Column 3: Environmental Component (Receiving Environment) Affected
- Column 4: Potential Impact Description
- Column 5: Management Objective/Outcome (Avoid, Modify, Remedy, Control, Stop)
- Column 6: Management Measures (Actions)
- Column 7: Legal Requirements (Compliance with Standards)
- Column 8: Timeframe for Implementation
- Column 9: Standard to be Achieved

Impact Management Measures Tables compiled for the Construction Phase for each environmental component considered are relayed in Tables 5.1 (a)-(n).

Impact Management Measures Tables compiled for the Operational Phase for each environmental component considered are relayed in Tables 5.2(a)-(n).

Impact Management Measures Tables compiled for the Decommissioning Phase for each environmental component considered are relayed in Tables 5.3(a)-(n).

Impact Management Measures Tables compiled for the Post Closure Phase for each environmental component considered are relayed in Tables 5.4(a)-(n).



5.1 Construction Phase (Proposed Activities)

Table 5.1(a): Construction Phase Impact Management Measures Table – Socio-Economic/Cultural

CONSTRUCTION PHASE - SOCIO-ECONOMIC/ CULTURAL								
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
West and North Upcast Ventilation Shafts	Shondoni Colliery	Social Cultural Aspects	Population influx impacts	Minimise negative impacts related to population influx	Prioritise local employment Clearly communicated local labour procurement strategy as well as proof Contractors to ensure that workers do not establish informal houses No informal vending 'stations' should be allowed close to site On-site construction workers should be supervised at all times	None	Throughout construction	Zero incidents from I&AP's.
West and North Upcast Ventilation Shafts	Shondoni Colliery	Social Cultural Aspects	Community safety impacts	Minimise negative impacts on community safety	Access to the construction area should be restricted and controlled The construction sites should be clearly marked Employ permanent security personnel Manage operational risks of construction workers Establish a Fire/Emergency Management Plan Appropriate fire-fighting equipment should be on site and training provided Open fires should not be allowed on site All construction vehicles should be in a good condition The construction of additional access roads should be limited Speeding of construction vehicles must be strictly monitored Speed limits should be enforced Where appropriate - warning signs should be erected	Occupational Health and Safety Act (Act No. 85 of 1993).	Throughout construction	Zero incidents from I&AP's.



CONSTRUCTION PHASE - SOCIO-ECONOMIC/ CULTURAL									
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	ation Type nagement Management Measures pjective/ utcome)		Timeframe for Implementation	Standard to be achieved	
West and North Upcast Ventilation Shafts	Shondoni Colliery	Social Cultural Aspects	Nuisance factors	Minimise negative impacts related to nuisance factors	The mitigation measures of the Noise and Air Quality Impact Assessments are relevant Construction vehicles should be in a good working order Dust suppression measures should be applied if and when necessary The stakeholders (through a forum) should be kept informed of the construction schedules and activities	Air quality standards	Throughout construction	Zero incidents from I&AP's.	
West and North Upcast Ventilation Shafts	Shondoni Colliery	Socio- Economic Aspects	Job and income creation	Enhance local job and employment opportunities	Prioritise local labour in the recruitment process Provide up-skilling opportunities for unskilled and semi-skilled local workers	No legal standard	As part of contractor management plan for the duration of the construction period.	Recruit most of unskilled labour from adjacent local areas with highest poverty rates Up-skill 20% of unskilled	
West and North Upcast Ventilation Shafts	Shondoni Colliery	Socio-Economic Aspects	Labour draw- down from agricultural sector	Mitigate impact of labour-drawn on local farmers	Prioritise recruiting unskilled workers among the unemployed Align unskilled wages to other local sectors	No legal standard	As part of contractor management plan for the duration of the construction period.	% of complaints resolved % of unskilled that were formerly employed	



CONSTRUCTION PHASE - ARCHAEOLOGICAL/ HERITAGE / PALAEONTOLOGY									
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved	
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Heritage Aspects	Undetected subsurface graves might occur	Remedy possible impact with implementing chance find procedure	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons/ Restrict impact to development footprint	
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Heritage Aspects	Undetected subsurface graves might occur	Remedy possible impact with implementing chance find procedure	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons/ Restrict impact to development footprint	
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Heritage Aspects	Possible impact on existing graves	Remedy possible impact with implementing chance find procedure	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons/ Restrict impact to development footprint. Avoid graves.	
	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Heritage Aspects	Possible impact on Historical Remains	Remedy with application for documentation and destruction	Documenting historical remains: Plan profile drawings, photographing and description	SAHRA Requirements (Approval/ Destruction Permit)	Documentation Process (4 months)	Avoid Historical Remains.	
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Heritage Aspects	Possible impact on existing graves	Remedy possible impact with implementing chance find procedure	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons/ Restrict impact to development footprint. Avoid graves.	
	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Heritage Aspects	Possible impact on Historical Remains	Remedy with application for documentation and destruction	Documenting historical remains: Plan profile drawings, photographing and description	SAHRA Requirements (Approval/ Destruction Permit)	Documentation Process (4 months)	Avoid Historical Remains.	

Table 5.1(b): Construction Phase Impact Management Measures Table - Archaeological/ Heritage / Palaeontology



CONSTRUCTION PHASE - ARCHAEOLOGICAL/ HERITAGE / PALAEONTOLOGY									
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved	
Proposed Ventilation Shafts	Shondoni Colliery	Palaeontological Fossils	Unlikely exposure of plant fossils	Remedy by assessing the fossils before further development takes place so that the necessary rescue operations can be implemented by a qualified palaeontologist	Qualified palaeontologist to assess fossils	SAHRA Requirements	During construction activities	Restrict impact to development footprint.	
					Qualified palaeontologist to implement chance find procedure	SAHRA Requirements	During construction activities	Restrict impact to development footprint.	


				CONSTRUCTIO	N PHASE - TOPOGRAPHY			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR	Topography: Morphology	Creation of dangerous/ unstable excavation	Control by adhering to approved civil engineering design and site safety	Fence-off footprint area Limit development/disturbance/activity to footprint area Ensure efficient construction activities, no unnecessary delays in construction activities Civil Engineer to inspect construction site and progress	Civil Design Specifications	Construction Phase	Existence of stable landforms and free-draining surfaces
	Portion 11		excavation	specifications	Construct earth berms around area to be cleared Minimise unnecessary soil stripping on site Conduct stockpiling in accordance with specifications of soil scientist	Soils, Ecological and Water Specialist Report Specifications		Sustainable stockpiling of topsoil
West Downcast Ventilation	Shondoni Colliery - Farm Brakspruit	Topography: Morphology	Creation of dangerous/ unstable	Control by adhering to approved civil engineering design	Fence-off footprint area Limit development/disturbance/activity to footprint area Ensure efficient construction activities, no unnecessary delays in construction activities Civil Engineer to inspect construction site and progress	Civil Design Specifications	Construction	Existence of stable landforms and free-draining surfaces
Ventilation Shaft	359 IR Portion 8	····· F····· 60	excavation	and site salety specifications	Construct earth berms around area to be cleared Minimise unnecessary soil stripping on site Conduct stockpiling in accordance with specifications of soil scientist	Soils, Ecological and Water Specialist Report Specifications		Sustainable stockpiling of topsoil

Table 5.1(c): Construction Phase Impact Management Measures Table – Topography



				CONSTRUCTIO	N PHASE - TOPOGRAPHY			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
North Upcast Ventilation	Shondoni Colliery - Farm Kromdraai	Topography: Morphology	Creation of dangerous/ unstable	Control by adhering to approved civil engineering design and site safety specifications	Fence-off footprint area Limit development/disturbance/activity to footprint area Ensure efficient construction activities, no unnecessary delays in construction activities Civil Engineer to inspect construction site and progress	Civil Design Specifications	Construction Phase	Existence of stable landforms and free-draining surfaces
Shaft	128 IS Portion 4		excavation		Construct earth berms around area to be cleared Minimise unnecessary soil stripping on site Conduct stockpiling in accordance with specifications of soil scientist	Soils, Ecological and Water Specialist Report Specifications		Sustainable stockpiling of topsoil
North Downcast Ventilation	Shondoni Colliery - Farm Kromdraai 128 IS Portion	ndoni iery - Creation o urm Topography: dangerous ndraai Morphology unstable		on of ous/ ble cous/ ble cous/	Fence-off footprint area Limit development/disturbance/activity to footprint area Ensure efficient construction activities, no unnecessary delays in construction activities Civil Engineer to inspect construction site and progress	Civil Design Specifications	Construction Phase	Existence of stable landforms and free-draining surfaces
Shaft 1	4		excavation	specifications	Construct earth berms around area to be cleared Minimise unnecessary soil stripping on site Conduct stockpiling in accordance with specifications of soil scientist	Soils, Ecological and Water Specialist Report Specifications		Sustainable stockpiling of topsoil



			CONSTRU	JCTION PHASE – SOILS, LANI	O CAPABILITY & LAND U	ISE		
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Socio-cultural, geographic, Topography and soil fertility. Issues of contamination, salinisation and change in land capability.	Change in land use and potential loss of resource, sterilisation of footprint of disturbance, erosion and compaction of unprotected soils and salinisation from dirty water runoff and/or contamination from poorly managed construction vehicles. Impact on in-situ and downstream/downwind water and soils.	Manage and control size of area of disturbance and access to site, avoid vehicle use over unprotected soils. Remove and store soils prior to construction, manage stormwater and dirty water runoff, avoid spillage of reagent and hydrocarbons during construction activities.	Compile a site specific management plan. Restrict vegetative clearing and soil removal to as small a footprint as possible, store soils as berms upslope of activities as part of stormwater controls. Soil management as part of routine housekeeping - Auditable. Control Vehicle movement.	Chamber of Mines Guidelines and International Best Practice Guidelines. Delineate footprint of disturbance, sites for stockpile of utilisable soils, strip and stockpile materials and manage stormwater (Construct berms and cut-off trenches etc.).	Management Plan as part of Design Phase, and implementation as part of Construction Phase, through Operation and into decommissioning	International Best Practice Standards - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation) and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Socio-cultural, geographic, Topography and soil fertility. Issues of contamination, salinisation and change in land capability.	Change in land use and potential loss of resource, sterilisation of footprint of disturbance, erosion and compaction of unprotected soils and salinisation from dirty water runoff and/or contamination from poorly managed construction vehicles. Impact on in-situ and downstream/downwind water and soils.	Manage and control size of area of disturbance and access to site, avoid vehicle use over unprotected soils. Remove and store soils prior to construction, manage stormwater and dirty water runoff, avoid spillage of reagent and hydrocarbons during construction activities.	Compile a site specific management plan. Restrict vegetative clearing and soil removal to as small a footprint as possible, store soils as berms upslope of activities as part of stormwater controls. Soil management as part of routine housekeeping. Control Vehicle movement.	Chamber of Mines Guidelines and International Best Practice Guidelines. Delineate footprint of disturbance, sites for stockpile of utilisable soils, strip and stockpile materials and manage stormwater (Construct berms and cut-off trenches etc.).	Management Plan as part of Design Phase, and implementation as part of Construction Phase, through Operation and into decommissioning	International Best Practice Standards - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation) and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).

Table 5.1(d): Construction Phase Impact Management Measures Table – Soils, Land Capability & Land Use



			CONSTRU	ICTION PHASE – SOILS, LAND	CAPABILITY & LAND U	JSE		
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Socio-cultural, geographic, Topography and soil fertility. Issues of contamination, salinisation and change in land capability.	Change in land use and potential loss of resource, sterilisation of footprint of disturbance, erosion and compaction of unprotected soils and salinisation from dirty water runoff and/or contamination from poorly managed construction vehicles. Impact on in-situ and downstream/downwind water and soils.	Manage and control size of area of disturbance and access to site, avoid vehicle use over unprotected soils. Remove and store soils prior to construction, manage stormwater and dirty water runoff, avoid spillage of reagent and hydrocarbons during construction activities.	Compile a site specific management plan. Restrict vegetative clearing and soil removal to as small a footprint as possible, store soils as berms upslope of activities as part of stormwater controls. Soil management as part of routine housekeeping. Control Vehicle movement.	Chamber of Mines Guidelines and International Best Practice Guidelines. Delineate footprint of disturbance, sites for stockpile of utilisable soils, strip and stockpile materials and manage stormwater (Construct berms and cut-off trenches etc.).	Management Plan as part of Design Phase, and implementation as part of Construction Phase, through Operation and into decommissioning	International Best Practice Standards - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Socio-cultural, geographic, Topography and soil fertility. Issues of contamination, salinisation and change in land capability.	Change in land use and potential loss of resource, sterilisation of footprint of disturbance, erosion and compaction of unprotected soils and salinisation from dirty water runoff and/or contamination from poorly managed construction vehicles. Impact on in-situ and downstream/downwind water and soils.	Manage and control size of area of disturbance and access to site, avoid vehicle use over unprotected soils. Remove and store soils prior to construction, manage stormwater and dirty water runoff, avoid spillage of reagent and hydrocarbons during construction activities.	Compile a site specific management plan. Restrict vegetative clearing and soil removal to as small a footprint as possible, store soils as berms upslope of activities as part of stormwater controls. Soil management as part of routine housekeeping. Control Vehicle movement.	Chamber of Mines Guidelines and International Best Practice Guidelines. Delineate footprint of disturbance, sites for stockpile of utilisable soils, strip and stockpile materials and manage stormwater (Construct berms and cut-off trenches etc.).	Management Plan as part of Design Phase, and implementation as part of Construction Phase, through Operation and into decommissioning	International Best Practice Standards - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



	CONSTRUCTION PHASE - GEOLOGY											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Geology: Lithology	Changes in lithology due to the development of the Ventilation Shaft	Control through implementing design specifications	Project Manager to inspect development of the mining shaft complex. Keep record of the lithology removed; compile as-built drawing.	As-built drawings	Throughout development of the ventilation shaft	Detailed plans and drawings of the development				
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Geology: Lithology	Changes in lithology due to the development of the Ventilation Shaft	Control through implementing design specifications	Project Manager to inspect development of the mining shaft complex. Keep record of the lithology removed; compile as-built drawing.	As-built drawings	Throughout development of the ventilation shaft	Detailed plans and drawings of the development				
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Geology: Lithology	Changes in lithology due to the development of the Ventilation Shaft	Control through implementing design specifications	Project Manager to inspect development of the mining shaft complex. Keep record of the lithology removed; compile as-built drawing.	As-built drawings	Throughout development of the ventilation shaft	Detailed plans and drawings of the development				
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Geology: Lithology	Changes in lithology due to the development of the Ventilation Shaft	Control through implementing design specifications	Project Manager to inspect development of the mining shaft complex. Keep record of the lithology removed; compile as-built drawing.	As-built drawings	Throughout development of the ventilation shaft	Detailed plans and drawings of the development				

Table 5.1(e): Construction Phase Impact Management Measures Table – Geology



			CONSTR	UCTION PHASE - GROUN	DWATER			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Depletion in groundwater availability as a result of groundwater seepage during the construction of the shaft complex.	Groundwater seepage into the Ventilation Shaft complex during construction activities, through weathered and fresh aquifer units.	Control through grout/seal influx zones and pump seepage water away. Prevent long residence time of ground water accumulation in the shaft complex.	Grout/seal influx zones and reuse or pump seepage water to underground storage compartments.	WUL Section 21(a), Taking water from a water resource.	Throughout the development of the ventilation shaft.	Detailed plans and drawings of the development.
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Depletion in groundwater availability as a result of groundwater seepage during the construction of the shaft complex.	Groundwater seepage into the Ventilation Shaft complex during construction activities, through weathered and fresh aquifer units.	Control through grout/seal influx zones and pump seepage water away. Prevent long residence time of ground water accumulation in the shaft complex.	Grout/seal influx zones and reuse or pump seepage water to underground storage compartments.	WUL Section 21(a), Taking water from a water resource.	Throughout the development of the ventilation shaft.	Detailed plans and drawings of the development.
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Depletion in groundwater availability as a result of groundwater seepage during the construction of the shaft complex.	Groundwater seepage into the Ventilation Shaft complex during construction activities, through weathered and fresh aquifer units.	Control through grout/seal influx zones and pump seepage water away. Prevent long residence time of ground water accumulation in the shaft complex.	Grout/seal influx zones and reuse or pump seepage water to underground storage compartments.	WUL Section 21(a), Taking water from a water resource.	Throughout the development of the ventilation shaft.	Detailed plans and drawings of the development.
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Depletion in groundwater availability as a result of groundwater seepage during the construction of the shaft complex.	Groundwater seepage into the Ventilation Shaft complex during construction activities, through weathered and fresh aquifer units.	Control through grout/seal influx zones and pump seepage water away. Prevent long residence time of ground water accumulation in the shaft complex.	Grout/seal influx zones and reuse or pump seepage water to underground storage compartments.	WUL Section 21(a), Taking water from a water resource.	Throughout the development of the ventilation shaft.	Detailed plans and drawings of the development.

Table 5.1(f): Construction Phase Impact Management Measures Table – Groundwater



			CONSTRUCTION PH	ASE – SURFACE WAT	`ER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Surface Water Quantity	Fencing of Site, Clearance of Vegetation, Topsoil Stripping, Construction of Facility - 1,0 ha. Depletion in the quantity of surface water due to the capture of direct rainfall and ponding in poorly excavated areas	Control through prevention of ponding in construction areas	Ensure free drainage from construction area and pumping out of trapped water in large excavations	Best Practice Guidelines with regards to maximising clean water runoff	During the construction phase	No visible signs of surface water ponding
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Surface Water Quality	Fencing of Site, Clearance of Vegetation, Topsoil Stripping, Construction of Facility - 1,0 ha. Reduction in the quality of surface water due to generation of sedimentation during rainfall.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Surface Water Quantity	Fencing of Site, Clearance of Vegetation, Topsoil Stripping, Construction of Facility - 0,4 ha. Depletion in the quantity of surface water due to the capture of direct rainfall and ponding in poorly excavated areas.	Control through prevention of ponding in construction areas	Ensure free drainage from construction area and pumping out of trapped water in large excavations	Best Practice Guidelines with regards to maximising clean water runoff	During the construction phase	No visible signs of surface water ponding
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Surface Water Quality	Fencing of Site, Clearance of Vegetation, Topsoil Stripping, Construction of Facility - 0,4 ha. Depletion in the quantity of surface water due to the capture of direct rainfall and ponding in poorly excavated areas.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Surface Water Quantity	Fencing of Site, Clearance of Vegetation, Topsoil Stripping, Construction of Facility - 0,8 ha. Depletion in the quantity of surface water due to the capture of direct rainfall and ponding in poorly excavated areas.	Control through prevention of ponding in construction areas	Ensure free drainage from construction area and pumping out of trapped water in large excavations	Best Practice Guidelines with regards to maximising clean water runoff	During the construction phase	No visible signs of surface water ponding

Table 5.1(g): Construction Phase Impact Management Measures Table – Surface Water



			CONSTRUCTION PH	ASE – SURFACE WAT	ER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Surface Water Quality	Fencing of Site, Clearance of Vegetation, Topsoil Stripping, Construction of Facility - 0,8 ha. Depletion in the quantity of surface water due to the capture of direct rainfall and ponding in poorly excavated areas.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Surface Water Quantity	Fencing of Site, Clearance of Vegetation, Topsoil Stripping, Construction of Facility - 0,7 ha. Depletion in the quantity of surface water due to the capture of direct rainfall and ponding in poorly excavated areas.	Control through prevention of ponding in construction areas	Ensure free drainage from construction area and pumping out of trapped water in large excavations	Best Practice Guidelines with regards to maximising clean water runoff	During the construction phase	No visible signs of surface water ponding
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Surface Water Quality	Fencing of Site, Clearance of Vegetation, Topsoil Stripping, Construction of Facility - 0,7 ha. Depletion in the quantity of surface water due to the capture of direct rainfall and ponding in poorly excavated areas.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives



	CONSTRUCTION PHASE - PLANT LIFE (FLORA)												
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved					
West Upcast and Downcast Ventilation Shafts	Shondoni Colliery - Farm Brakspruit 359 IR Portions 8 & 11	Cultivated Lands	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species Weekly inspections of the construction site, focussing on areas of bare soil where plants can get established. Control of any population of invasive species by alien plant control team.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014.	Construction Phase	No established populations of alien invasive species at the end of each annual audit.					
North Upcast and Downcast Ventilation	Shondoni Colliery - Farm Kromdraai	Untransformed grassland	Direct loss of Natural Habitat in a listed Threatened Ecosystem	Minimisation - topsoil management and Rehabilitation - post-closure restoration of habitat	Quantitative assessment of plant species diversity within proposed footprint – to establish post closure rehabilitation objectives. Topsoil to be stored adjacent to the construction area. Topsoil stockpiles to be adequately landscaped to minimise soil erosion. Weekly inspections of topsoil for establishment of invasive alien plant species (remove immediately).	NEMBA (10/2004); National List of Ecosystems that are Threatened and in need of Protection – GNR 1002 of 09 December 2011	Construction Phase	Topsoil stockpiles to remain viable through life of mine to be used during rehabilitation.					
Shafts	128 IS Portion 4	(degraded)	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species Weekly inspections of the construction site, focussing on areas of bare soil where plants can get established. Control of any population of invasive species by alien plant control team.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014.	Construction Phase	No established populations of alien invasive species at the end of each annual audit.					

Table 5.1(h): Construction Phase Impact Management Measures Table - Plant Life (Flora)



	CONSTRUCTION PHASE – ANIMAL LIFE (FAUNA)											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
North Upcast and Downcast Ventilation Shafts	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Populations of Avifauna Species of Conservation Concern	Disturbance or loss of populations of fauna Species of Conservation Concern through noise disturbance during construction activities	Minimisation - reduction in noise produced by construction activities	Reduce noise produced by construction activities to an acceptable threshold as determined by noise specialist	To be determined by noise specialist	Construction phase	Acceptable noise threshold (to be determined by noise specialist) to be consistently achieved				

Table 5.1(i): Construction Phase Impact Management Measures Table – Animal Life (Fauna)



	CONSTRUCTION PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirement s/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
West Upcast Ventilation Shaft; West					Ensure sediments are prevented from entering watercourses; Sediment traps should be installed along the lower edges of soil stockpiles and stormwater outlets.	WUL, RQO, Best Practice Guidelines	Before activity commencement and throughout construction phase.	Eroded sediments contained within the development footprint, - stormwater not to discharge directly into wetlands or watercourses.				
				Minimise the development footprint and cordon off wetland areas as no-go areas for vehicular access as far as possible.WUL, Biodiversity targetsBefore act commence and throug tonstruction	Before activity commencement and throughout construction phase.	No impacts to wetlands.						
				Prevent erosion from the construction site	Construction during winter (dry season only).	WUL, RQO, Best Practice Guidelines	Throughout construction phase.	Eroded sediments and dust contained within the development footprint - stormwater not to discharge directly into wetlands or watercourses.				
Downcast Ventilation Shaft; North Upcast Ventilation Shaft; North Downcast Ventilation	Shondoni Colliery	oni Aquatic ry Ecosystems	Increased runoff due to vegetation being cleared and replaced with hardened surfaces.	and ensure sediments are trapped and prevented from being carried by stormwater into receiving watercourses	and ensure sediments are trapped and prevented from being carried by stormwater into receiving watercourses	Stormwater should be diverted from construction activities, flows attenuated and dispersed into grassed verges and not directly into wetlands or watercourses. Consider/ investigate installation of erosion protection and energy dissipaters at points of discharge.	WUL, RQO, Best Practice Guidelines	Before activity commencement and throughout construction phase.	No erosion visible downslope of development footprint.			
Ventilation Shaft					Soil stockpiles should be located outside of wetland areas and their buffers.	WUL, RQO, Best Practice Guidelines	Throughout construction phase.	Eroded sediments contained within the development footprint, - stormwater not to discharge directly into wetlands or watercourses.				
					Toilet facilities must be located well outside of wetland areas.	WUL, RQO, BPEO, NEMWA	Before activity commencement and throughout construction phase.	No contamination of surface water by sewage effluent.				

Table 5.1(j): Construction Phase Impact Management Measures Table – Aquatic Ecosystems



	CONSTRUCTION PHASE - AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirement s/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
West Upcast Ventilation			Increased turbidity and	Prevent erosion from the	Exposed soils should be revegetated after construction to optimise infiltration and reduce erosion.	WUL, RQO, Best Practice Guidelines	Before activity commencement and throughout construction phase.	Eroded sediments contained within the development footprint.				
Ventilation turb Shaft; West sedir Downcast due Ventilation Shondoni Aquatic sed Shaft; North Colliery Ecosystems carr Upcast re	sedimentation due to eroded sediments carried to the receiving	construction site and ensure sediments are trapped and prevented from	Spills and leaks (e.g. fuel, grease and oils) should be immediately addressed and managed. All vehicles must be regularly inspected for leaks.	aks (e.g. fuel, grease build be immediately nd managed. All st be regularly r leaks.	Before activity commencement and throughout construction phase.	No contamination of surface water.						
Ventilation Shaft; North Downcast Ventilation Shaft			Waterval River in stormwater runoff.	being carried by stormwater into receiving watercourses	Solid waste and hazardous waste must be removed from site and appropriately disposed of.	BPEO, NEMWA	Before activity commencement and throughout construction phase.	No contamination of surface water.				
					Monitor water quality, including turbidity, and erosion within receiving watercourse.	WUL, RQO, Best Practice Guidelines	Before activity commencement and throughout construction phase.	Ensure compliance with WUL and RQO				



				CONST	RUCTION PHASE - WETLANDS																
Project Activity	Location	Environmental Aspect Affected	Potential Impact Mitigation Type (Management Objective/ Outcome)		Management Measures	Legal Requirements / Compliance with Standards	Timeframe for Implementation	Standard to be achieved													
	PROPOSED ACTIVITIES																				
					Optimise design of shaft infrastructure to minimise size of disturbance footprint and vegetation clearing required.	WUL, RQO, Best Practice Guidelines	During Design Phase, prior to commencement of construction	Minimum 100m buffer between wetland and disturbance footprint.													
					Clearly demarcate construction servitude and limit all activity to demarcated area.	WUL, RQO, Best Practice Guidelines	Prior to commencement of construction	Contain all disturbances within authorised footprint.													
					Maintain a minimum 100m vegetated buffer between construction footprint and wetland boundary.	WUL, RQO, Best Practice Guidelines	Throughout project	Minimum 100m buffer between wetland and disturbance footprint.													
			Clearing of vegetation resulting in		Develop and implement a construction stormwater management plan that aims to minimise mobilisation of sediment as well as transport of sediment.	WUL, RQO, Best Practice Guidelines	Prior to commencement of large scale vegetation clearing	Contain all disturbances within authorised footprint.													
West	Shondoni Colliery - Farm		increased surface runoff. Runoff transporting sediments and contaminants into	Modify and control. Limit extent of disturbance, avoid wetlands, prevent mobilisation and transport of sediment, waste management, alien	te Modify and control. Limit extent of disturbance, avoid wetlands, prevent mobilisation and transport of sediment, waste management, alien	No direct discharge of stormwater into wetlands. Stormwater to be discharged into vegetated areas and be suitably protected against erosion.	WUL, RQO, Best Practice Guidelines	Throughout project.	No erosion downslope of development footprint. No erosion or sediment fans in wetlands.												
Ventilation Shaft	Brakspruit 359 IR Portion 11	Wetlands	adjacent wetlands. Disturbances to wetland			transport of sediment, waste management, alien	transport of sediment, waste management, alien	transport of sediment, waste management, alien	transport of sediment, waste management, alien	mobilisation and transport of sediment, waste management, alien	mobilisation and transport of sediment, waste management, alien	mobilisation and transport of sediment, waste management, alien	transport of sediment, waste management, alien	Install sediment barriers along downslope edge of cleared areas	WUL, RQO, Best Practice Guidelines						
			vegetation due to edge effects. Increase in alien vegetation.	vegetation control.	No washing of equipment in wetlands and no abstraction of water from adjacent wetlands unless expressly authorised in the WUL.	WUL, RQO, Best Practice Guidelines	Throughout project.	Contain all disturbances within authorised footprint.													
			vegetation.		Implement waste management plan. Dispose of waste in suitable facilities offsite. Provide toilet facilities away from wetlands. Address spills and leaks of contaminants immediately.	WUL, RQO, Best Practice Guidelines	Throughout project.	No contamination of surface waters in wetlands.													
					Re-vegetate disturbed areas as soon as possible.	WUL, RQO, Best Practice Guidelines	As soon as possible after clearing of vegetation. To be completed before completion of construction phase.	Contain all disturbances within authorised footprint.													

Table 5.1(k): Construction Phase Impact Management Measures Table - Wetlands



				CONST	RUCTION PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements / Compliance with Standards	Timeframe for Implementation	Standard to be achieved
					Implement alien vegetation management plan.	Alien and Invasive Species Regulations	Throughout project.	No loss in habitat integrity due to invasion by invasive alien species.
					Optimise design of shaft infrastructure to minimise size of disturbance footprint and vegetation clearing required.	WUL, RQO, Best Practice Guidelines	During Design Phase, prior to commencement of construction	Minimum 100m buffer between wetland and disturbance footprint.
					Clearly demarcate construction servitude and limit all activity to demarcated area.	WUL, RQO, Best Practice Guidelines	Prior to commencement of construction	Contain all disturbances within authorised footprint.
					Maintain a minimum 100m vegetated buffer between construction footprint and wetland boundary.	WUL, RQO, Best Practice Guidelines	Throughout project	Minimum 100m buffer between wetland and disturbance footprint.
			Clearing of vegetation resulting in increased surface		Develop and implement a construction stormwater management plan that aims to minimise mobilisation of sediment as well as transport of sediment.	WUL, RQO, Best Practice Guidelines	Prior to commencement of large scale vegetation clearing	Contain all disturbances within authorised footprint.
West Downcast Ventilation	Shondoni Colliery - Farm Brakspruit	Wetlands	runoff. Runoff transporting sediments and contaminants into adjacent	Modify and control. Limit extent of disturbance, avoid wetlands, prevent mobilisation and	No direct discharge of stormwater into wetlands. Stormwater to be discharged into vegetated areas and be suitably protected against erosion.	WUL, RQO, Best Practice Guidelines	Throughout project.	No erosion downslope of development footprint. No erosion or sediment fans in wetlands.
Shaft	359 IR Portion 8		wetlands. Disturbances to wetland vegetation due to	sediment, waste management, alien vegetation control.	Install sediment barriers along downslope edge of cleared areas.	WUL, RQO, Best Practice Guidelines	Prior to commencement of large scale vegetation clearing	Contain all disturbances within authorised footprint.
			edge effects. Increase in alien vegetation.		No washing of equipment in wetlands and no abstraction of water from adjacent wetlands unless expressly authorised in the WUL.	WUL, RQO, Best Practice Guidelines	Throughout project.	Contain all disturbances within authorised footprint.
					Implement waste management plan. Dispose of waste in suitable facilities offsite. Provide toilet facilities away from wetlands. Address spills and leaks of contaminants immediately.	WUL, RQO, BPEO, NEMWA	Throughout project.	No contamination of surface waters in wetlands.
					Re-vegetate disturbed areas as soon as possible.	WUL, RQO, Best Practice Guidelines	As soon as possible after clearing of vegetation. To be completed before	Contain all disturbances within authorised footprint.



				CONSTI	RUCTION PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	l Mitigation T l (Manageme d Potential Impact Objective Outcome		Management Measures	Legal Requirements / Compliance with Standards	Timeframe for Implementation	Standard to be achieved
							completion of construction phase.	
					Implement alien vegetation management plan.	Alien and Invasive Species Regulations	Throughout project.	No loss in habitat integrity due to invasion by invasive alien species.
					Optimise design of shaft infrastructure to minimise size of disturbance footprint and vegetation clearing required.	WUL, RQO, Best Practice Guidelines	During Design Phase, prior to commencement of construction	Minimum 100m buffer between wetland and disturbance footprint.
					Clearly demarcate construction servitude and limit all activity to demarcated area.	WUL, RQO, Best Practice Guidelines	Prior to commencement of construction	Contain all disturbances within authorised footprint.
			Clearing of		Maintain a minimum 100m vegetated buffer between construction footprint and wetland boundary.	WUL, RQO, Best Practice Guidelines	Throughout project	Minimum 100m buffer between wetland and disturbance footprint
	Shondoni		vegetation resulting in increased surface runoff. Runoff transporting	Modify and control. Limit extent of disturbance, avoid wetlands, prevent mobilisation and transport of sediment, waste	Develop and implement a construction stormwater management plan that aims to minimise mobilisation of sediment as well as transport of sediment.	WUL, RQO, Best Practice Guidelines	Prior to commencement of large scale vegetation clearing	Contain all disturbances within authorised footprint.
North Upcast Ventilation Shaft	Colliery - Farm Kromdraai 128 IS Portion 4	Colliery - Farm Wetlands Tromdraai 128 IS Portion 4	sediments and contaminants into adjacent wetlands. Disturbances to		No direct discharge of stormwater into wetlands. Stormwater to be discharged into vegetated areas and be suitably protected against erosion.	WUL, RQO, Best Practice Guidelines	Throughout project.	No erosion downslope of development footprint. No erosion or sediment fans in wetlands.
			wetland vegetation due to edge effects. Increase in alien	vegetation control.	Install sediment barriers along downslope edge of cleared areas.	WUL, RQO, Best Practice Guidelines	Prior to commencement of large scale vegetation clearing	Contain all disturbances within authorised footprint.
			vegetation.		No washing of equipment in wetlands and no abstraction of water from adjacent wetlands unless expressly authorised in the WUL.	WUL, RQO, Best Practice Guidelines	Throughout project.	Contain all disturbances within authorised footprint.
					Implement waste management plan. Dispose of waste in suitable facilities offsite. Provide toilet facilities away from wetlands. Address spills and leaks of contaminants immediately.	WUL, RQO, Best Practice Guidelines	Throughout project.	No contamination of surface waters in wetlands.



	CONSTRUCTION PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements / Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					Re-vegetate disturbed areas as soon as possible.	WUL, RQO, Best Practice Guidelines	As soon as possible after clearing of vegetation. To be completed before completion of construction phase.	Contain all disturbances within authorised footprint.				
					Implement alien vegetation management plan.	Alien and Invasive Species Regulations	Throughout project.	No loss in habitat integrity due to invasion by invasive alien species.				
					Optimise design of shaft infrastructure to minimise size of disturbance footprint and vegetation clearing required.	Design Report	During Design Phase, prior to commencement of construction	Minimum 100m buffer between wetland and disturbance footprint.				
					Clearly demarcate construction servitude and limit all activity to demarcated area.	WUL, RQO, Best Practice Guidelines	Prior to commencement of construction	Contain all disturbances within authorised footprint.				
			Clearing of vegetation resulting in		Maintain a minimum 100m vegetated buffer between construction footprint and wetland boundary.	WUL, RQO, Best Practice Guidelines	Throughout project	Minimum 100m buffer between wetland and disturbance footprint.				
North	Shondoni Colliery -		increased surface runoff. Runoff transporting sediments and	Modify and control. Limit extent of disturbance, avoid wetlands, prevent	Develop and implement a construction stormwater management plan that aims to minimise mobilisation of sediment as well as transport of sediment.	WUL, RQO, Best Practice Guidelines	Prior to commencement of large scale vegetation clearing	Contain all disturbances within authorised footprint.				
Ventilation Shaft	Farm Kromdraai 128 IS Portion 4	Wetlands	adjacent wetlands. Disturbances to wetland	mobilisation and transport of sediment, waste management, alien vegetation control.	No direct discharge of stormwater into wetlands. Stormwater to be discharged into vegetated areas and be suitably protected against erosion.	WUL, RQO, Best Practice Guidelines	Throughout project.	No erosion downslope of development footprint. No erosion or sediment fans in wetlands.				
			edge effects. Increase in alien vegetation.		Install sediment barriers along downslope edge of cleared areas.	WUL, RQO, Best Practice Guidelines	Prior to commencement of large scale vegetation clearing	Contain all disturbances within authorised footprint.				
					No washing of equipment in wetlands and no abstraction of water from adjacent wetlands unless expressly authorised in the WUL.	WUL, RQO, Best Practice Guidelines	Throughout project.	Contain all disturbances within authorised footprint.				
					Implement waste management plan. Dispose of waste in suitable facilities offsite. Provide toilet facilities away from wetlands.	WUL, RQO, Best Practice Guidelines	Throughout project.	No contamination of surface waters in wetlands.				



	CONSTRUCTION PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements / Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					Address spills and leaks of contaminants immediately.							
					Re-vegetate disturbed areas as soon as possible.	WUL, RQO, Best Practice Guidelines	As soon as possible after clearing of vegetation. To be completed before completion of construction phase.	Contain all disturbances within authorised footprint.				
					Implement alien vegetation management plan.	Alien and Invasive Species Regulations	Throughout project.	No loss in habitat integrity due to invasion by invasive alien species.				
					Crossing design to make allowance for flow connectivity to be maintained across the full width of the unchannelled valley bottom wetland and the full width of the macro- channel on the floodplain.	WUL, RQO, Best Practice Guidelines	During Design Phase, prior to commencement of construction	Maintain existing flow distribution and retention patterns within the wetland.				
			Loss of wetland habitat within road footprint, flow	Modify and control.	Detailed construction method statements to be developed for the proposed access road crossings. Method statements to be reviewed by a wetland specialist.	WUL, RQO, Best Practice Guidelines	During Design Phase, prior to commencement of construction	Contain all disturbances within authorised footprint.				
Access Road to North	Shondoni Colliery - Farm	Wetlands	concentration within wetlands, increased risk of erosion in wetlands flow	Limit extent of disturbance, limit changes to flow characteristics, prevent	Access road to follow existing farm track and access roads.	WUL, RQO, Best Practice Guidelines	During Design Phase, prior to commencement of construction	Standard to be achieved 2 Contain all disturbances within authorised footprint. 2 X No loss in habitat integrity due to invasion by invasive alien species. se, Maintain existing flow distribution and retention patterns within the wetland. se, Contain all disturbances within authorised footprint. e. Contain all disturbances within authorised footprint. e. Contain all disturbances within authorised footprint. contain all disturbances within authorised footprint. Contain all disturbances within authorised footprint. contain all Contain all disturbances within authorised footprint.				
North Downcast Ventilation Shaft	Kromdraai 128 IS Portion 4	weddiad	wetlands, flow impoundment upslope of crossings, changes in flow retention and distribution in wetlands, changes in habitat.	mobilisation and transport of sediment, waste management, alien vegetation control.	No laydown areas, temporary stockpiles or construction camps to be located within wetlands or within 100m of delineated wetland areas. Identify designated laydown areas prior to commencement of construction.	WUL, RQO, Best Practice Guidelines	Design phase and construction phase.	No additional wetland disturbance. Contain all disturbances within authorised footprint.				
					Construction to take place during the low flow season and outside the peak of the rainfall season.	WUL, RQO, Best Practice Guidelines	Construction Phase.	Contain all disturbances within authorised footprint.				
					No washing of equipment in wetlands and no abstraction of water from adjacent wetlands unless expressly authorised in the WUL.	WUL, RQO, Best Practice Guidelines	Throughout project.	Contain all disturbances within authorised footprint.				



				CONSTR	RUCTION PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements / Compliance with Standards	Timeframe for Implementation	Standard to be achieved
					Clearly demarcate construction servitude and limit all activity to demarcated area.	WUL, RQO, Best Practice Guidelines	Prior to commencement of construction	Contain all disturbances within authorised footprint.
					Re-vegetate disturbed areas as soon as possible.	WUL, RQO, Best Practice Guidelines	As soon as possible after clearing of vegetation. To be completed before completion of construction phase.	Contain all disturbances within authorised footprint.
					Install sediment barriers along downslope edge of cleared areas	WUL, RQO, Best Practice Guidelines	Prior to commencement of large scale vegetation clearing	Contain all disturbances within authorised footprint.
					Implement alien vegetation management plan	Alien and Invasive Species Regulations	Throughout project.	No loss in habitat integrity due to invasion by invasive alien species.



			CONS	STRUCTION PHASE - AI	R QUALITY			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Fugitive dust emissions from land clearing and materials handling, gaseous vehicle exhaust from construction equipment and generators	Increased particulate (PM ₁₀ & PM _{2.5}) concentrations at sensitive receptor locations. Increased dust fallout rates at sensitive receptor locations. Increased SO ₂ , NO ₂ and CO concentrations at sensitive receptor locations.	Minimise fugitive dust and gaseous emissions	Minimise disturbed areas. Keep material being handled moist. Installation of wind breaks to prevent wind erosion from disturbed areas. Re-vegetation of disturbed areas. Regular maintenance and servicing of construction vehicles.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non-residential limit of 1200 mg/m ² /day. PM ₁₀ , PM _{2.5} , NO ₂ , CO and SO ₂ concentrations in compliance with the SA NAAQS	Throughout the construction phase	Compliance with SA NDCR and SA NAAQS.
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Fugitive dust emissions from land clearing and materials handling, gaseous vehicle exhaust from construction equipment and generators	Increased particulate $(PM_{10} \& PM_{2.5})$ concentrations at sensitive receptor locations. Increased dust fallout rates at sensitive receptor locations. Increased SO ₂ , NO ₂ and CO concentrations at sensitive receptor locations.	Minimise fugitive dust and gaseous emissions	Minimise disturbed areas. Keep material being handled moist. Installation of wind breaks to prevent wind erosion from disturbed areas. Re-vegetation of disturbed areas. Regular maintenance and servicing of construction vehicles.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non-residential limit of 1200 mg/m ² /day. PM ₁₀ , PM _{2.5} , NO ₂ , CO and SO ₂ concentrations in compliance with the SA NAAQS	Throughout the construction phase	Compliance with SA NDCR and SA NAAQS.
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Fugitive dust emissions from land clearing and materials handling, gaseous vehicle exhaust from construction equipment and generators	Increased particulate (PM ₁₀ & PM _{2.5}) concentrations at sensitive receptor locations. Increased dust fallout rates at sensitive receptor locations. Increased SO ₂ , NO ₂ and CO concentrations at sensitive receptor locations.	Minimise fugitive dust and gaseous emissions	Minimise disturbed areas. Keep material being handled moist. Installation of wind breaks to prevent wind erosion from disturbed areas. Re-vegetation of disturbed areas. Regular maintenance and servicing of construction vehicles.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non-residential limit of 1200 mg/m ² /day. PM ₁₀ , PM _{2.5} , NO ₂ , CO and SO ₂ concentrations in compliance with the SA NAAQS	Throughout the construction phase	Compliance with SA NDCR and SA NAAQS.
North Downcast	Shondoni Colliery - Farm	Fugitive dust emissions from land clearing and materials handling,	Increased particulate (PM ₁₀ & PM _{2.5}) concentrations at	Minimise fugitive dust and gaseous emissions	Minimise disturbed areas. Keep material being handled moist.	Dust fallout at residential locations below NDCR residential limit of	Throughout the construction phase	Compliance with SA

Table 5.1(l): Construction Phase Impact Management Measures Table – Air Quality



	CONSTRUCTION PHASE – AIR QUALITY											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Ventilation Shaft	Kromdraai 128 IS Portion 4	gaseous vehicle exhaust from construction equipment and generators	sensitive receptor locations. Increased dust fallout rates at sensitive receptor locations. Increased SO ₂ , NO ₂ and CO concentrations at sensitive receptor locations.		Installation of wind breaks to prevent wind erosion from disturbed areas. Re-vegetation of disturbed areas. Regular maintenance and servicing of construction vehicles.	600mg/m ² /day. Dust fallout at other locations below non-residential limit of 1200 mg/m ² /day. PM ₁₀ , PM _{2.5} , NO ₂ , CO and SO ₂ concentrations in compliance with the SA NAAOS		NDCR and SA NAAQS.				



		^		CONSTRUCTIO	N PHASE - NOISE			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
West Upcast Ventilation	Shondoni Colliery - Farm Brakspruit	Noise	Noise disturbance due to increase in	No mitigation required – Mitigation measures should	No mitigation required – Mitigation measures should	National Noise Regulations	Design Phase	Noise Regulations Prevent noise disturbance. Increase in ambient level not to exceed 7dB (Moderate Impact)
Shaft	359 IR Portion 11		level	be implemented during design phase	be implemented during design phase	SANS 10103 Guidelines		SANS 10103 Increase in ambient level not to exceed 3dB (Minor Impact)
West Downcast Vontilation	Shondoni Colliery - Farm Brakspruit	Noise	Noise disturbance due to increase in	No mitigation required – Mitigation measures should	No mitigation required – Mitigation measures should	National Noise Regulations	Design Phase	Noise Regulations Prevent noise disturbance. Increase in ambient level not to exceed 7dB (Moderate Impact)
Shaft	359 IR Portion 8		level	be implemented during design phase	be implemented during design phase	SANS 10103 Guidelines		SANS 10103 Increase in ambient level not to exceed 3dB (Minor Impact)
North Upcast Ventilation	Shondoni Colliery - Farm Kromdraai	Noise	Noise disturbance due to increase in	No mitigation required – Mitigation measures should	No mitigation required – Mitigation measures should	National Noise Regulations	Design Phase	Noise Regulations Prevent noise disturbance. Increase in ambient level not to exceed 7dB (Moderate Impact)
Shaft	128 IS Portion 4		level	be implemented during design phase	be implemented during design phase	SANS 10103 Guidelines		SANS 10103 Increase in ambient level not to exceed 3dB (Minor Impact)
North Downcast Ventilation	Shondoni Colliery - Farm Kromdraai	Noise	Noise disturbance due to increase in	No mitigation required – Mitigation measures should	No mitigation required – Mitigation measures should	National Noise Regulations	Design Phase	Noise Regulations Prevent noise disturbance. Increase in ambient level not to exceed 7dB (Moderate Impact)
Shaft	128 IS Portion 4		level	be implemented during design phase	be implemented during design phase	SANS 10103 Guidelines		SANS 10103 Increase in ambient level not to exceed 3dB (Minor Impact)

Table 5.1(m): Construction Phase Impact Management Measures Table – Noise



	CONSTRUCTION PHASE - VISUALS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Activities that generate dust from construction of site infrastructure and moving vehicles. Activities that are subject to shaping of landforms (stockpiles and dumps) that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Restrict the extent of visible dust migration. Manage Landshaping Activities. Manage Good Housekeeping.	Implement Dust Suppression according to the Dust Suppression Protocol. Implement the Shaping of Landforms according to Landform Shaping Protocol Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Construction Phase.	Visibility of activity to be acceptable in local and regional environment. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape.			
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Activities that generate dust from construction of site infrastructure and moving vehicles. Activities that are subject to shaping of landforms (stockpiles and dumps) that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Restrict the extent of visible dust migration. Manage Landshaping Activities. Manage Good Housekeeping.	Implement Dust Suppression according to the Dust Suppression Protocol. Implement the Shaping of Landforms according to Landform Shaping Protocol Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Construction Phase.	Visibility of activity to be acceptable in local and regional environment. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape.			
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Activities that generate dust from construction of site infrastructure and moving vehicles. Activities that are subject to shaping of landforms (stockpiles and dumps) that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Restrict the extent of visible dust migration. Manage Landshaping Activities. Manage Good Housekeeping.	Implement Dust Suppression according to the Dust Suppression Protocol. Implement the Shaping of Landforms according to Landform Shaping Protocol Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Construction Phase.	Visibility of activity to be acceptable in local and regional environment. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape.			

Table 5.1(n): Construction Phase Impact Management Measures Table – Visuals



	CONSTRUCTION PHASE - VISUALS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Activities that generate dust from construction of site infrastructure and moving vehicles. Activities that are subject to shaping of landforms (stockpiles and dumps) that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Restrict the extent of visible dust migration. Manage Landshaping Activities. Manage Good Housekeeping.	Implement Dust Suppression according to the Dust Suppression Protocol. Implement the Shaping of Landforms according to Landform Shaping Protocol Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Construction Phase.	Visibility of activity to be acceptable in local and regional environment. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape.			



5.2 **Operational Phase**

Table 5.2(a): Operational Phase Impact Management Measures Table – Socio-Economic/Cultural

	OPERATIONAL PHASE - SOCIO-ECONOMIC/ CULTURAL											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				SHONDONI SH	IAFT COMPLEX AND PROPOSED NEV	V ACTIVITIES						
Whole operation	Shondoni Colliery	Social Cultural Aspects	Population influx impacts	Minimise negative impacts related to population influx	Prioritise local employment Clearly communicated local labour procurement strategy as well as proof	None	Throughout operations	Zero incidents from I&AP's				
Whole operation	Shondoni Colliery	Socio-Economic Aspects	Job and income creation	Enhance local job and employment opportunities	Continue to prioritise local labour in the recruitment process Provide up-skilling opportunities as per SLP Develop a database of goods and services that could potentially be locally outsourced Establish a supplier development programme as part of the LED component of future SLPs If relevant put a contractor management in place to ensure that the local employment and procurement targets are met	Social and Labour Plans as per the Regulation 46 of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) and the Mining Charter (2018)	Throughout operations	Most recruitment of additional labour from local communities Recruitment from communities adjacent to Shondoni should be aligned with contribution to production share Local procurement target of to be established (discretionary non- labour spent)				
Whole operation	Shondoni Colliery	Socio-Economic Aspects	Community Development Funds	Enhance the positive impact of community development funds	Target LED programmes for poor communities adjacent to the Shondoni Colliery	Social and Labour Plans as per the Regulation 46 of the Mineral and Petroleum Resources Development Act (Act No. 28 of2002) The Mining Charter (2018)	Throughout operations	The budget for SLP projects in the areas adjacent to Shondoni to be aligned with Shondonis' share in production, i.e. in the region of 20% of the total LED budget of the SLP The 2018 Mining Charter targets an equity equivalent benefit to the minimum of 5% to be allocated to LED projects				



				OPERATI	ONAL PHASE - SOCIO-ECONOMIC/ CU	ILTURAL		
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Whole operation	Shondoni Colliery	Socio-Economic Aspects	Decrease in Local Economic Diversity	Mitigate against the negative impacts of decrease in economic diversity	Focus on the support of non- mining related activities in community development programmes Focus the local procurement programme on non-core mining inputs	None	Throughout operations	50% of local supply spending on non-core services and products
				Mitigata againat	Develop a resource use plan to minimize the mining operations' energy and water use	Watan quality		Water quality standards as per the Geohydrology and Surface Water Hydrology reports
Whole operation	Shondoni Colliery	Socio-Economic Aspects	Increase in Local Resource Use	high intensity resource use (water and energy)	Ensure that water quality and quantity issues are managed appropriately Mitigation measures of the Geohydrology and Surface Water Hydrology Impact Assessments must be strictly implemented	standards as per the Geohydrology and Surface Water Hydrology reports	Throughout operations	Water and Energy use reduction



				OPERATIONAL PHASE - ARCHAEO	LOGICAL/ HERITAGE			
Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
				SHONDONI SHAFT CO	OMPLEX			
Underground Mining	Shondoni Shaft Complex	Heritage Aspects	Subsidence Impact on Graves	Remedy with reactive response on I&AP complaints	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons
Underground Mining	Shondoni Shaft Complex	Heritage Aspects	Subsidence Impact on Historical Remains	Remedy with reactive response on I&AP complaints	Documenting historical remains: Plan profile drawings, photographing and description	SAHRA Requirements (Approval/ Destruction Permit)	Documentation Process (4 months)	Positive community liaisons
Underground Mining	Shondoni Shaft Complex	Palaeontological Fossils	Unlikely exposure of plant fossils	Remedy by assessing the fossils before further development takes place so that the necessary rescue operations can be implemented by a qualified palaeontologist	Implement rescue operations	SAHRA Requirements	As per rescue operation	Positive community liaisons
				SIMUNYE SHAFT CO	MPLEX			
Underground Mining	Simunye Shaft Complex	Heritage Aspects	Subsidence Impact on Graves	Remedy with reactive response on I&AP complaints	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons
Underground Mining	Shondoni Shaft Complex	Heritage Aspects	Subsidence Impact on Historical Remains	Remedy with reactive response on I&AP complaints	Documenting historical remains: Plan profile drawings, photographing and description	SAHRA Requirements (Approval/ Destruction Permit)	Documentation Process (4 months)	Positive community liaisons
				PROPOSED ACTIV	ITIES			
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Heritage Aspects	Subsidence Impact on Graves	Remedy with reactive response on I&AP complaints	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Heritage Aspects	Subsidence Impact on Historical Remains	Remedy with reactive response on I&AP complaints	Documenting historical remains: Plan profile drawings, photographing and description	SAHRA Requirements (Approval/ Destruction Permit)	Documentation Process (4 months)	Positive community liaisons

Table 5.2(b): Operational Phase Impact Management Measures Table – Archaeological/ Heritage



	OPERATIONAL PHASE - TOPOGRAPHY												
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved					
					SHONDONI SHAFT COMPLEX								
					Detailed topographical survey every two years	MHSA Regulations Section 17	-						
Underground Mining	Shondoni Shaft Complex	Topography: Stability	Creation of areas prone to surface subsidence	Remedy areas where subsidence has	Provide an I&AP grievance register and investigate registered complaints	SHE Manual	s/ lards Timeframe for Implementation Standard to be achieved n 17 Operational Phase Subsided areas to be free-draining. No ponding. with ean Operational Phase Subsided areas to be free-draining. No ponding. er Operational Phase Sustainable stockpiling of topsoil er Operational Phase Sustainable stockpiling of topsoil er Operational Phase No coal stockpiled beyond designated footprint er Operational Phase No stonedust stockpiled beyond						
					Ensure ground surface where subsidence has occurred is made free- draining	Best Practice Guidelines with regards to maximising clean water runoff		no ponunig.					
			Creation of		Minimise unnecessary soil stripping on site	Soils, Ecological and Water Specialist Report Specifications	Timeframe for Implementation Stand be action Operational Phase Subsid areas to free-dn No por Operational Phase Sustain stockp topsoi Operational Phase Sustain stockp topsoi Operational Phase No coa stockp beyon design footpr Operational Phase No coa stockp beyon design footpr						
Topsoil/ Overburden Stockpile	Shondoni Shaft Complex	Topography: Morphology	unstable dumps due to stockpiling of	Avoid unnecessary soil stripping on site	Conduct stockpiling in accordance with specifications of soil scientist	Soils, Ecological and Water Specialist Report Specifications	Operational Phase	Sustainable stockpiling of topsoil					
			topsoil/ overburden	on site	Regular inspection and maintenance of topsoil/ overburden berms to ensure free-draining surfaces	Soils, Ecological and Water Specialist Report Specifications							
Coal Stockpile	Shondoni	Topography:	Creation of dangerous/ unstable	Avoid stockpiling	Stockpile ROM material according to operational (supply and demand) requirements	Soils, Ecological and Water Specialist Report Specifications	On east and Dhane	No coal stockpiled					
Out Area	Complex	Morphology	dumps due to stockpiling of coal	designated footprint area	Confine stockpile to designated footprint area	Soils, Ecological and Water Specialist Report Specifications	Operational Phase	designated footprint					
Stonedust	Shondoni	Topography:	Creation of dangerous/ unstable	Avoid stockpiling	Stockpile stonedust material according to operational (supply and demand) requirements	Soils, Ecological and Water Specialist Report Specifications	Operational Phase	No stonedust stockpiled					
Dump	Complex	Morphology	dumps due to stockpiling of stonedust	designated footprint area	Confine stockpile to designated footprint area	Soils, Ecological and Water Specialist Report Specifications	operational Phase	designated footprint					

Table 5.2(c): Operational Phase Impact Management Measures Table – Topography



	OPERATIONAL PHASE - TOPOGRAPHY											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					SIMUNYE SHAFT COMPLEX							
Underground	Simunye	Topography	Creation of	Remedy areas	Detailed topographical survey every two years Provide an I&AP grievance register and	MHSA Regulations Section 17	-	Subsided				
Mining	Shaft Complex	Stability	to surface subsidence	subsidence has occurred	investigate registered complaints Ensure ground surface where subsidence has occurred is made free- draining	Best Practice Guidelines with regards to maximising clean water runoff	Operational Phase	free-draining. No ponding.				
			Creation of dangerous/	A	Minimise unnecessary soil stripping on site	Soils, Ecological and Water Specialist Report Specifications						
Topsoil/ Overburden Stockpile	Simunye Shaft Complex	Topography: Morphology	unstable dumps due to stockpiling of	Avoid unnecessary soil stripping	Conduct stockpiling in accordance with specifications of soil scientist	Soils, Ecological and Water Specialist Report Specifications	Operational Phase	Sustainable stockpiling of topsoil				
-			topsoil/ overburden	UII SILL	Regular inspection and maintenance of topsoil/ overburden berms to ensure free-draining surfaces	Soils, Ecological and Water Specialist Report Specifications						
Stonedust	Simunye	Topography:	Creation of dangerous/ unstable	Avoid stockpiling	Stockpile stonedust material according to operational (supply and demand) requirements	Soils, Ecological and Water Specialist Report Specifications	O	No stonedust stockpiled beyond designated footprint				
Dump	Snart Complex	Morphology	dumps due to stockpiling of stonedust	beyond designated footprint area	Confine stockpile to designated footprint area	Soils, Ecological and Water Specialist Report Specifications	 Operational Phase 					
					PROPOSED ACTIVITIES	-						
	Chandani				Detailed topographical survey every two years	MHSA Regulations Section 17						
Underground Mining (New Block 8 North)	Colliery – New Block 8 North	Topography: Stability	Creation of areas prone to surface	Remedy areas where subsidence has	Provide an I&AP grievance register and investigate registered complaints	SHE Manual	Operational Phase	Subsided areas to be free-draining.				
	8 North Reserve				Ensure ground surface where subsidence has occurred is made free-draining	Best Practice Guidelines with regards to maximising clean water runoff						



	OPERATIONAL PHASE - TOPOGRAPHY											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
			Creation of dangerous/	A	Minimise unnecessary soil stripping on site	Soils, Ecological and Water Specialist Report Specifications		Standard to be achieved Sustainable stockpiling of topsoil				
Ventilation Shafts	Shondoni Colliery	Topography: Morphology	/: y stockpiling of	unnecessary soil stripping	Conduct stockpiling in accordance with specifications of soil scientist	Soils, Ecological and Water Specialist Report Specifications	Operational Phase					
			topsoil/ overburden	on site	Regular inspection and maintenance of topsoil/ overburden berms to ensure free-draining surfaces	Soils, Ecological and Water Specialist Report Specifications						



	OPERATIONAL PHASE- SOILS, LAND CAPABILITY & LAND USE											
Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
SHONDONI SHAFT COMPLEX												
Access Roads	Shondoni Shaft Complex	Sterilisation and loss of soils utilisation potential on disturbed footprint, de- nutrification (loss of fertility), change of land capability and possible contamination.	Continued loss of soil (ecosystem services) land capability due to uncontrolled erosion, compaction and the potential for salinisation and/or contamination by vehicle movement.	Manage and control/prevent further loss and contamination of resource. Minimise and maintain footprint of impact and monitor and audit soil stockpiles and berms as part of management plan.	Contain footprint area to minimum and manage erosion, compaction, contamination by dirty water (stormwater), product and hydrocarbon spillage. Ensure stability/cover to material (soils and soft overburden) stockpiles/berms.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Mange footprint of disturbance, and stability of material stockpile (utilisable soils and soft overburden), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).				
Security Fence and Access	Shondoni Shaft Complex	Sterilisation and loss of soil utilisation potential, de- nutrification (loss of fertility), possible erosion and compaction on in-situ soils as well as a change of land capability and land use.	Continued loss of soil (ecosystem services) and land capability due to uncontrolled erosion over unprotected (de- vegetated) soils.	Manage and control area of disturbed soils. Remedy erosion and/or compaction and effects of dirty water runoff. Minimise and maintain footprint of impact and monitor soil stockpiles/berms.	Contain footprint area to minimum and manage erosion, compaction, contamination by dirty water (stormwater), product and hydrocarbon spillage. Ensure stability/cover to material (soils and soft overburden) stockpiles/berms.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils and soft overburden), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).				

Table 5.2(d): Operational Phase Impact Management Measures Table – Soils, Land Capability & Land Use



			OPERA	ATIONAL PHASE- SOILS, LA	AND CAPABILITY & LAND	USE		
Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Offices, Workshops and Change houses	Shondoni Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification (loss of fertility) and possible contamination of stored soils from washing of mining equipment/vehicl es and machine servicing. Change of land capability and land use.	Potential for contamination of in-situ and stored soils due to dirty water (hydrocarbon and/or reagents) runoff, dust and the operation of vehicles.	Manage and control footprint of impact, monitor and audit dirty water runoff and contamination from hydrocarbons, reagents and sewage from Workshops, Offices and Change house. Minimise footprint of impact and monitor soil stockpiles/berms.	Contain footprint area to minimum and manage erosion, compaction, contamination by dirty water (stormwater), product and hydrocarbon spillage. Ensure stability/cover to material (soils and soft overburden) stockpiles/berms.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils and soft overburden), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Internal Roads and Parking Areas	Shondoni Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential on disturbed footprint, de- nutrification/loss of soil fertility and possible contamination by dirty water runoff and hydrocarbon spillage from vehicles on in- situ and stored soils. Change of land capability and land use.	Continued loss of soil (ecosystem services) and land capability due to uncontrolled erosion, compaction and the potential for salinisation and/or contamination by vehicle and or product spillage.	Manage and prevent further loss and contamination of in- situ and stored soil resource. Minimise and maintain footprint of impact and monitor dirty water runoff and stability of soil stockpiles/berms.	Contain footprint area to minimum and manage erosion, compaction, contamination by dirty water runoff (stormwater), hydrocarbon/reagents and product (coal) spillage. Ensure stability/cover to material (soils and soft overburden) stockpiles/berms.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils and soft overburden), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



			OPERA	TIONAL PHASE- SOILS, L	AND CAPABILITY & LAND	USE		
Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Electricity Supply	Shondoni Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of fertility, erosion of stored/stockpiles and unprotected soils and contamination by spillage/leakage of Substation Cooling Oil. A change of land capability and land use associated with Overhead Powerlines and Service Roadway.	Continued loss of soil (ecosystem services) and land capability due to uncontrolled erosion over unprotected (de- vegetated) soils along Powerline Route, and contamination due to oil spillage from substation transformers.	Manage and control footprint of impact, contain and control contamination by oils and reagents from fuel storage facilities. Manage erosion, compaction and stormwater runoff from hard surfaces. Manage soil stockpiles/berms.	Contain footprint of impact and Manage linear infrastructure, reduce possibility of dirty water runoff (erosion and downstream contamination) and manage stability of material stockpiles.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils and soft overburden), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Fuel & Oil Storage	Shondoni Shaft Complex	Sterilisation and loss of utilisation potential of disturbed footprint, de- nutrification/loss of stored soil fertility, contamination by dirty water and fuel/oil handling and storage. Change of land capability and land use.	Continued loss of in-situ and stored soil (ecosystem services) and land capability due to uncontrolled erosion over unprotected (de- vegetated) soils, and contamination due to oil spillage from substation transformers.	Manage and control footprint of impact, contain and control contamination by oils and reagents from transformers. Manage erosion, compaction and stormwater runoff associated with powerline infrastructure (service road etc.). Manage soil stockpiles/berms.	Contain footprint area to minimum and manage erosion, compaction, contamination by dirty water (stormwater), hydrocarbon spillage. Ensure stability/cover to material (soils and soft overburden) stockpiles/berms.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and possible contamination (Fuel oils).	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



			OPERA	TIONAL PHASE- SOILS, L	AND CAPABILITY & LAND	USE		
Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Explosives Off- Load Area	Shondoni Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential of disturbed footprint, de- nutrification/loss of soil fertility, and contamination of Off-Load Footprint Area by explosive reagents and/or dirty water runoff on in-situ and stored soils. Change of land capability and land use.	On-going sterilisation of soil (ecosystem services) and loss of land capability due to uncontrolled erosion over unprotected (de- vegetated) soils, and contamination due to spillage of explosive reagents.	Manage and control size of footprint of impact, contain and control contamination from explosives off- load.	Contain footprint of impact and Manage Explosives off-loading within legal guidelines of health and safety.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of soil stockpile (utilisable soils), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and possible contamination.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Man and Material Shaft Infrastructure	Shondoni Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of soil fertility and possible contamination from washing of mining equipment on in- situ and stored soils. Change of land capability and land use.	On-going sterilisation of soil (ecosystem services) and loss of land capability over footprint of infrastructure, erosion and compaction over unprotected (de- vegetated) soils (wind and water), and possible contamination/sali nisation.	Manage and control footprint area, stormwater controls (berms, dams and channels) and potential for contamination.	Contain footprint area to minimum and manage contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of soil berms/stockpile (utilisable soils), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind).	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Conveyor System	Shondoni Shaft Complex	Sterilisation, loss of in-situ soil utilisation potential, de- nutrification (loss of fertility), contamination from spillage of coal product and hydrocarbons/re agents and dirty water runoff on stored and in-situ soils along linear infrastructure and service road. Change of land capability and land use.	Ongoing loss of resource and soil utilization potential, and the potential for contamination by spillage of product (coal) and hydrocarbons	Manage and control footprint area (conveyer infrastructure and service road), stormwater controls (berms, channels) and potential for contamination from dirty water runoff and spillage of product.	Contain footprint area to minimum and manage contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage linear footprint of disturbance, and stability of soil berms (utilisable soils), management of stormwater (clean and dirty) runoff, and downstream impacts from erosion (water and wind) and contamination from product spillage.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Ventilation Shaft	Shondoni Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of stored soil fertility and possible contamination from dirty water runoff and hydrocarbon/rea gent spillage on stored and in-situ soils. Change of land capability and land use.	Continued loss of soil resource and utilization potential, plus possible contamination of footprint soils by operational activities.	Manage and control footprint area, stormwater controls (berms, dams and channels) and potential for contamination.	Contain footprint area to minimum and manage contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of soil berms/stockpile (utilisable soils), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination (dirty water and hydrocarbons).	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Underground Mining	Shondoni Shaft Complex	Sterilisation, loss of in-situ soil utilisation potential and de- nutrification on areas of subsidence due to ponding and soil saturation. Salinisation of ponded areas and infiltration to groundwater environment. Change of land capability and land use.	Potential for sterilisation of soil (ecosystem services) and loss of land capability over areas of subsidence, ponding of surface water and associated salinisation due to lack of free draining.	Design and control of mining method and geotechnical considerations to minimise potential for collapse of underground works. Management of subsidence and ponding of water at surface.	Evaluate and design, monitor and rehabilitate timeously. Contain footprint area to minimum and manage ponding, ingress and erosion.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Monitor and Manage footprint of disturbance (possible subsidence) and rehabilitate. Manage stormwater (clean and dirty) runoff and downstream impacts from infiltration and/or saturation due to ponding within areas of subsidence.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if impacts occur.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Topsoil/ Overburden Stockpile	Shondoni Shaft Complex	Sterilisation, loss of in-situ soil utilisation potential, de- nutrification or loss of stored soil fertility, contamination from dirty water runoff and/or spillage of coal product and hydrocarbons/re agents on stored and in-situ soils. Change of land capability and land use. Storage of Topsoil/ Overburden	On-going sterilisation of in- situ and stored (berms) soil, loss of ecosystem services due to uncontrolled erosion (wind and water), and possible contamination due to dirty water runoff and/or spillage of reagents.	Manage emplacement and minimise footprint impact, control stormwater runoff and erosion and impact of dirty water on stored soils. Monitor and audit annually.	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water and possible dust contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Monitor and Manage footprint of disturbance for dirty water ingress, stormwater (clean and dirty) runoff and downstream impacts of erosion from berms and stockpiles on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Coal Storage in Surface Bunker	Shondoni Shaft Complex	Loss of in-situ soil utilisation potential/sterilis ation of resource, possible contamination of in-situ and stored soils by product and/or dirty water runoff. Change of Land capability and Land Use.	On-going sterilisation of in- situ and stripped/stored (berms) soil, loss of ecosystem services and potential for salinisation and contamination of in-situ and stored soils due to spillage of product and dirty water runoff.	Manage and control footprint area (Coal Storage and associated infrastructure), stormwater controls (berms, channels) and potential for contamination from dirty water runoff and spillage of product.	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (contamination - product dust and dirty water runoff).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Monitor and Manage footprint of disturbance for dirty water ingress, stormwater (clean and dirty) runoff and downstream impacts of erosion from Coal Storage facility on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Coal Stockpile and Throw-Out Area	Shondoni Shaft Complex	Loss of in-situ soil utilisation potential/sterilis ation of resource, possible contamination of in-situ and stored soils by product and/or dirty water runoff. Change of Land capability and Land Use.	On-going sterilisation of in- situ and stripped/stored (berms) soil, loss of ecosystem services and potential for salinisation and contamination of in-situ and stored soils due to spillage of product and dirty water runoff.	Manage and control footprint area (Coal Storage and associated infrastructure), stormwater controls (berms, channels) and potential for contamination from dirty water runoff and spillage of product.	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Monitor and Manage footprint of disturbance for dirty water ingress, stormwater (clean and dirty) runoff and downstream impacts of erosion from Throw-out area and Coal Storage facility on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).


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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Stonedust Dump	Shondoni Shaft Complex	Loss of in-situ soil utilisation potential/sterilis ation of resource, possible contamination of in-situ and stored soils by dirty water runoff. Change of Land capability and Land Use.	On-going sterilisation of in- situ and stripped/stored (berms) soil, loss of ecosystem services and potential for salinisation and/or contamination of in-situ and stored soils due to product ingress and/or stormwater runoff.	Manage and control footprint area (Coal Storage and associated infrastructure), stormwater controls (berms, channels) and potential for contamination from dirty water runoff and spillage of product.	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Monitor and Manage footprint of disturbance for dirty water ingress, stormwater (clean and dirty) runoff and downstream impacts of erosion from Stonedust Dump facility on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Potable Water Supply System (Pipelines)	Shondoni Shaft Complex	Sterilisation, loss of in-situ soil utilisation potential along reticulation line, de-nutrification and loss of fertility on stored materials. Possible contamination from dirty water runoff on stored and in-situ soils along linear infrastructure and associated service road. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soil over footprint of pump station and along reticulation servitude. Possible erosion and compaction of unprotected (de- vegetated) sites.	Manage and control footprint area (Minimise Water Management and associated infrastructure), stormwater controls (berms, channels), erosion (water) and compaction along water servitudes.	Maintain footprint of impact to minimum, monitor and manage stormwater controls, erosion and compaction of soil resource.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage linear footprint of disturbance, and stability of soil berms (stored/stockpiled utilisable soils), management of stormwater (clean and dirty) runoff, and downstream impacts from erosion/spillage.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Potable Water Reservoir	Shondoni Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of stored soil fertility. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soil over footprint of reservoir. Possible erosion (water leakage) of unprotected (de- vegetated) sites.	Manage and control footprint area (Minimise Water Management and associated infrastructure), stormwater controls (berms, channels) and erosion.	Maintain footprint of impact to minimum, monitor and manage stormwater controls, erosion and compaction of soil resource.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of utilisable soil berms/stockpiles, management of stormwater (clean and dirty) runoff, and downstream impacts from erosion on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).				
Shondoni PCD	Shondoni Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of soil fertility and possible contamination from dirty water runoff on stored and in-situ soils. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soil over footprint of PCD. Possible erosion (water leakage) of unprotected (de- vegetated) sites.	Manage and control footprint area (Pollution Control Dam and associated infrastructure), stormwater controls (berms, channels) and potential for contamination from dirty water runoff and overflow.	Maintain footprint of impact to minimum, monitor and manage stormwater controls, erosion and compaction of soil resource.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of utilisable soil berms/stockpiles, management of stormwater (clean and dirty) runoff, and downstream impacts of contamination from erosion and PCD spillage/overflow on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).				



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Shondoni Incline PCD	Shondoni Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of soil fertility and possible contamination from dirty water runoff on stored and in-situ soils. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soil over footprint of PCD Possible erosion (water leakage) of unprotected (de- vegetated) sites.	Manage and control footprint area (Pollution Control Dam and associated infrastructure), stormwater controls (berms, channels) and potential for contamination from dirty water runoff and overflow.	Maintain footprint of impact to minimum, monitor and manage stormwater controls, erosion and compaction of soil resource.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of utilisable soil berms/stockpiles, management of stormwater (clean and dirty) runoff, and downstream impacts of contamination from erosion and PCD spillage/overflow on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Surface Service Water Reservoir	Shondoni Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of soil fertility and possible contamination from dirty water runoff on stored and in-situ soils. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soil over footprint of service water reservoir. Possible erosion (water leakage) of unprotected (de- vegetated) sites.	Manage and control of footprint area (Minimise Water Management and associated infrastructure), stormwater controls (berms, channels) around dam structure.	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of utilisable soil berms/stockpiles, management of stormwater (clean and dirty) runoff, and downstream impacts from erosion on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Service Water Reticulation System (Pipelines)	Shondoni Shaft Complex	Sterilisation, loss of in-situ soil utilisation potential along reticulation line, de-nutrification and loss of fertility on stored materials. Possible contamination from dirty water runoff on stored and in-situ soils along linear infrastructure and service road. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soil over footprint servitude of pipelines and associated infrastructure. Possible erosion (wind and water) and compaction of unprotected (de- vegetated) sites.	Manage and control of footprint area (Minimise Water Management and associated infrastructure), stormwater controls (berms, channels), erosion (water) and compaction along water servitudes (pipeline and service road).	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage linear footprint of disturbance, and stability of soil berms (stored/stockpiled utilisable soils), management of stormwater (clean and dirty) runoff, and downstream impacts from erosion/spillage.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Storm Water Berms and Canals	Shondoni Shaft Complex	Reduction of Runoff (volume) to Natural Resource - Sterilisation, loss of in-situ soil utilisation potential, de- nutrification or loss of stored soil fertility, contamination from dirty water runoff. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soils associated with footprint to stormwater control berms and channels. Possible erosion (water leakage) of unprotected (de- vegetated) sites.	Manage and control of footprint area (Minimise Stormwater Management Systems - berms, channels and dams) and design for attenuation of clean water runoff and effects of erosion.	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Monitor and Manage footprint of disturbance for dirty water ingress, stormwater (clean and dirty) runoff and downstream impacts of erosion on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Attenuation Dam/ Structure	Shondoni Shaft Complex	Reduction in clean water runoff to Natural Resource - Sterilisation, loss of in-situ soil utilisation potential on infrastructural footprint, de- nutrification/loss of fertility and possible contamination from dirty water runoff on stored soils. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms and/or dam wall) soils associated with footprint to attenuation dam. Possible erosion (water leakage) of unprotected (de- vegetated) sites.	Manage and control of footprint area (Minimise Stormwater Attenuation dam and associated infrastructure) and monitoring of effects of erosion and compaction over unprotected soils.	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Monitor and Manage footprint of disturbance for dirty water ingress, stormwater (clean and dirty) runoff and downstream impacts of erosion on attenuation dam and receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).			
Oil and Silt Traps	Shondoni Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential on infrastructural footprint, de- nutrification/loss of fertility and possible contamination from dirty water runoff and hydrocarbon spillage on stored soils. Change of land capability and land use.	On-going sterilisation of in- situ and stored soils associated with footprint to Workshops (Oil/Silt Traps) and Stormwater Controls. Possible erosion (water leakage) of unprotected (de- vegetated) sites and contamination due to spillage of hydrocarbons and runoff of uncontrolled dirty.	Manage and control of footprint area (Oil and Silt Traps), stormwater controls (berms, channels) and potential for contamination from dirty water runoff and outflow.	Contain footprint area to minimum and manage stormwater controls (dirty water contamination) and impact of hydrocarbons on receiving environment.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (silt and dust) and contamination (Fuel/Oil).	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).			



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Sewage Treatment Plant	Shondoni Shaft Complex	Sludge Drying Beds - Sterilisation & loss of in-situ soil utilisation potential on footprint, de- nutrification/loss of fertility and possible contamination from dirty water runoff and sewage water spillage stored and in-situ soils. Change of land capability & land use.	On-going sterilisation of in- situ and stored soils associated with footprint to Sewage Works and associated infrastructure. Possible erosion (water leakage) of unprotected (de- vegetated) sites and contamination by unprocessed sewage leakage/runoff.	Manage and control of footprint area (Sewage Works), stormwater controls (berms, channels) and potential for contamination from dirty water runoff and outflow of untreated waist water.	Contain footprint area to minimum and manage stormwater controls (dirty water contamination) and impact of untreated sewage discharge on receiving environment.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils), manage sewage treatment works and drying beds and control stormwater (clean and dirty) runoff and downstream impacts on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Iso Yard (Temporary storage of general, domestic and industrial waste)	Shondoni Shaft Complex	Movement of Vehicles, Material Transport, Storage of Materials - Sterilisation and loss of in-situ soil utilisation potential on infrastructural footprint, de- nutrification/loss of fertility and possible contamination from dirty water runoff and hydrocarbon spillage on stored soils. Change of land capability and land use.	Temporary sterilisation and loss of soil and utilisation potential and possibility erosion, compaction and contamination of in-situ and stored soils due to dirty water runoff, dust and the operation of vehicles.	Manage and control footprint area (Minimise Laydown area and confine to sass small a footprint as possible) stormwater controls (berms, channels and dams) and contamination of in-situ and/or stored soils by dirty water runoff.	Contain footprint area to minimum and manage stormwater controls (dirty water contamination) and impact of Industrial/Domestic Waste on receiving environment. Ensure disposal of waste to a licenced facility.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils), manage stormwater runoff (clean and dirty separation) and downstream impacts of hazardous waste on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



			OPERA	TIONAL PHASE- SOILS, LA	AND CAPABILITY & LAND	USE		
Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Iso Yard (Temporary storage of hazardous waste)	Shondoni Shaft Complex	Movement of Vehicles, Material Transport, Storage of Materials - Sterilisation & loss of in-situ soil utilisation potential on footprint, de- nutrification/loss of fertility and contamination from dirty water runoff and hydrocarbon spillage on stored soils. Change of land capability & land use.	Temporary sterilisation and loss of soil and utilisation potential, the possibility for erosion, compaction and contamination of in-situ and stored soils due to dirty water (hazardous hydrocarbon and/or reagents) runoff, dust and the operation of vehicles.	Manage and control footprint area (Minimise Laydown area and confine to sass small a footprint as possible) stormwater controls (berms, channels and dams) and contamination of in-situ and/or stored soils by hazardous materials.	Contain footprint area to minimum and manage stormwater controls (dirty water contamination) and impact of Hazardous Waste on receiving environment. Ensure disposal of waste to a licenced facility.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils), manage stormwater runoff (clean and dirty separation) and downstream impacts of general/domestic waste on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Capital Yard (Temporary storage of scrap metal)	Shondoni Shaft Complex	Movement of Vehicles, Material Transport, Storage of Materials - Sterilisation & loss of in-situ soil utilisation potential on footprint, de- nutrification/loss of fertility and contamination from dirty water runoff and hydrocarbon spillage on stored soils. Change of land capability and land use.	Temporary sterilisation and loss of soil and utilisation potential, possible erosion, compaction and contamination of in-situ and stored soils due to dirty water runoff, dust and the operation of vehicles.	Manage and control footprint area (Minimise Laydown area and confine to sass small a footprint as possible) stormwater controls (berms, channels and dams) and contamination of in-situ and/or stored soils by dirty water runoff.	Contain footprint area to minimum and manage stormwater controls (dirty water contamination) and impact of Industrial/Domestic Waste on receiving environment.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils), manage stormwater runoff (clean and dirty separation) and downstream impacts of general/domestic waste on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



	OPERATIONAL PHASE- SOILS, LAND CAPABILITY & LAND USE											
Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
	SIMUNYE SHAFT COMPLEX											
Access Roads	Simunye Shaft Complex	Sterilisation and loss of soils utilisation potential on disturbed footprint, de- nutrification (loss of fertility), change of land capability and possible contamination.	Continued loss of soil (ecosystem services) land capability due to uncontrolled erosion, compaction and the potential for salinisation and/or contamination by vehicle movement.	Manage and prevent further loss and contamination of resource. Minimise and maintain footprint of impact.	Contain footprint area to minimum and manage erosion, compaction, contamination by dirty water (stormwater), product and hydrocarbon spillage.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils and soft overburden), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).				
Security Fence and Access	Simunye Shaft Complex	Sterilisation and loss of soil utilisation potential, de- nutrification (loss of fertility), possible erosion and compaction on in-situ soils as well as a change of land capability and land use.	Continued loss of soil (ecosystem services) and land capability due to uncontrolled erosion over unprotected (de- vegetated) soils.	Manage and prevent further loss and contamination of resource. Minimise and maintain footprint of impact.	Contain footprint area to minimum and manage erosion, compaction and dirty water (stormwater) runoff.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils and soft overburden), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).				



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Offices, Workshops and Change houses	Simunye Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification (loss of fertility) and possible contamination of stored soils from washing of mining equipment/vehicl es and machine servicing. Change of land capability and land use.	Potential for contamination of in-situ and stored soils due to dirty water (hydrocarbon and/or reagents) runoff, dust and the operation of vehicles.	Manage and control footprint of impact, dirty water and contamination from hydrocarbons, reagents and sewage from Workshops, Offices and Change house.	Contain footprint area to minimum and manage contamination	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils and soft overburden), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).				
Internal Roads and Parking Areas	Simunye Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential on disturbed footprint, de- nutrification/loss of soil fertility and possible contamination by dirty water runoff and hydrocarbon spillage from vehicles on in- situ and stored soils. Change of land capability and land use.	Continued loss of soil (ecosystem services) and land capability due to uncontrolled erosion, compaction and the potential for salinisation and/or contamination by vehicle and or product spillage.	Manage and prevent further loss and contamination of resource. Minimise and maintain footprint of impact.	Contain footprint area to minimum and manage erosion, compaction, contamination by dirty water runoff (stormwater), hydrocarbon/reagents and product (coal) spillage.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils and soft overburden), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).				



			OPERA	ATIONAL PHASE- SOILS, L	AND CAPABILITY & LAND	USE		
Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Electricity Supply	Simunye Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of fertility, erosion of stored/stockpiles and unprotected soils and contamination by spillage/leakage of Substation Cooling Oil. A change of land capability and land use associated with Overhead Powerlines and Service Roadway.	Continued loss of soil (ecosystem services) and land capability due to uncontrolled erosion over unprotected (de- vegetated) soils along Powerline Route, and contamination due to oil spillage from substation transformers.	Manage and control footprint of impact, contain and control contamination oils and reagents from transformers. Manage erosion, compaction and stormwater associated with powerline infrastructure (service road etc.).	Contain footprint of impact and Manage fuel and oil storage infrastructure, reduce possibility of contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils and soft overburden), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Fuel Storage	Simunye Shaft Complex	Sterilisation and loss of utilisation potential of disturbed footprint, de- nutrification/loss of stored soil fertility, contamination by dirty water and fuel/oil handling and storage. Change of land capability and land use.	Continued loss of in-situ and stored soil (ecosystem services) and land capability due to uncontrolled erosion over unprotected (de- vegetated) soils, and contamination due to oil spillage from substation transformers.	Manage and control footprint of impact, contain and control contamination from oils and fuels.	Contain footprint of impact and Manage servicing of electrical infrastructure, reduce possibility of contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and possible contamination (Fuel oils).	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Man and Material Shaft Infrastructure	Simunye Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential of disturbed footprint, de- nutrification/loss of soil fertility, and contamination of Off-Load Footprint Area by explosive reagents and/or dirty water runoff on in-situ and stored soils. Change of land capability and land use.	On-going sterilisation of soil (ecosystem services) and loss of land capability over footprint of infrastructure, erosion and compaction over unprotected (de- vegetated) soils (wind and water), and possible contamination/sali nisation.	Manage and control footprint area, stormwater controls (berms, dams and channels) and potential for contamination.	Contain footprint area to minimum and manage contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of soil berms/stockpile (utilisable soils), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind).	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).				
Ventilation Shaft	Simunye Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of soil fertility and possible contamination from washing of mining equipment on in- situ and stored soils. Change of land capability and land use.	Continued loss of soil resource and utilization potential, plus possible contamination of footprint soils by operational activities.	Manage and control footprint area, stormwater controls (berms, dams and channels) and potential for contamination.	Contain footprint area to minimum and manage contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of soil berms/stockpile (utilisable soils), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination (dirty water and hydrocarbons).	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).				



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Underground Mining	Simunye Shaft Complex	Sterilisation, loss of in-situ soil utilisation potential and de- nutrification on areas of subsidence due to ponding and soil saturation. Salinisation of ponded areas and infiltration to groundwater environment. Change of land capability and land use.	Potential for sterilisation of soil (ecosystem services) and loss of land capability over areas of subsidence, ponding of surface water and associated salinisation due to lack of free draining.	Design and control of mining method and geotechnical considerations to minimise potential for collapse of underground works. Management of subsidence and ponding of water at surface.	Evaluate and design, monitor and rehabilitate timeously. Contain footprint area to minimum and manage ponding, ingress and erosion.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Monitor and Manage footprint of disturbance (possible subsidence) and rehabilitate. Manage stormwater (clean and dirty) runoff and downstream impacts from infiltration and/or saturation due to ponding within areas of subsidence.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if impacts occur.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).			
Topsoil/ Overburden Stockpile	Simunye Shaft Complex	Sterilisation, loss of in-situ soil utilisation potential, de- nutrification or loss of stored soil fertility, contamination from dirty water runoff and/or spillage of coal product and hydrocarbons/re agents on stored and in-situ soils. Change of land capability and land use. Storage of Topsoil/ Overburden	On-going sterilisation of in- situ and stored (berms) soil, loss of ecosystem services due to uncontrolled erosion (wind and water), and possible contamination due to dirty water runoff and/or spillage of reagents.	Manage emplacement and minimise footprint impact, control stormwater runoff and erosion and impact of dirty water on stored soils. Monitor and audit annually.	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Monitor and Manage footprint of disturbance for dirty water ingress, stormwater (clean and dirty) runoff and downstream impacts of erosion from berms and stockpiles on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).			



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Stone dust Dump	Simunye Shaft Complex	Loss of in-situ soil utilisation potential/sterilis ation of resource, possible contamination of in-situ and stored soils by dirty water runoff. Change of Land capability and Land Use.	On-going sterilisation of in- situ and stripped/stored (berms) soil, loss of ecosystem services and potential for salinisation and/or contamination of in-situ and stored soils due to product ingress and/or stormwater runoff.	Manage and control footprint area (Coal Storage and associated infrastructure), stormwater controls (berms, channels) and potential for contamination from dirty water runoff and spillage of product.	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Monitor and Manage footprint of disturbance for dirty water ingress, stormwater (clean and dirty) runoff and downstream impacts of erosion from Stonedust Dump facility on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Potable Water Supply System (Pipelines)	Simunye Shaft Complex	Sterilisation, loss of in-situ soil utilisation potential along reticulation line, de-nutrification and loss of fertility on stored materials. Possible contamination from dirty water runoff on stored and in-situ soils along linear infrastructure and associated service road. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soil over footprint of pump station and along reticulation servitude. Possible erosion and compaction of unprotected (de- vegetated) sites.	Manage and control footprint area (Minimise Water Management and associated infrastructure), stormwater controls (berms, channels), erosion (water) and compaction along water servitudes.	Maintain footprint of impact to minimum, monitor and manage stormwater controls, erosion and compaction of soil resource.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage linear footprint of disturbance, and stability of soil berms (stored/stockpiled utilisable soils), management of stormwater (clean and dirty) runoff, and downstream impacts from erosion/spillage.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Potable Water Reservoir	Simunye Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of stored soil fertility. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soil over footprint of Potable Water Reservoir. Possible erosion and compaction of unprotected (de- vegetated) sites.	Manage and control footprint area (Minimise Water Management and associated infrastructure), stormwater controls (berms, channels) and erosion	Maintain footprint of impact to minimum, monitor and manage stormwater controls, erosion and compaction of soil resource.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of utilisable soil berms/stockpiles, management of stormwater (clean and dirty) runoff, and downstream impacts from erosion on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Service Water Dam (Top)	Simunye Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of soil fertility and possible contamination from dirty water runoff on stored and in-situ soils. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soil over footprint of service water reservoir (Top). Possible erosion (water leakage) of unprotected (de- vegetated) sites.	Manage and control of footprint area (Minimise Water Management and associated infrastructure), stormwater controls (berms, channels) around dam structure.	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage linear footprint of disturbance, and stability of soil berms (stored/stockpiled utilisable soils), management of stormwater (clean and dirty) runoff, and downstream impacts from erosion/spillage.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Service Water Dam+A426:K48 5 (Bottom)	Simunye Shaft Complex	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of soil fertility and possible contamination from dirty water runoff on stored and in-situ soils. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soil over footprint of service water reservoir (Bottom). Possible erosion (water leakage) of unprotected (de- vegetated) sites.	Manage and control of footprint area (Minimise Water Management and associated infrastructure), stormwater controls (berms, channels) around dam structure.	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage linear footprint of disturbance, and stability of soil berms (stored/stockpiled utilisable soils), management of stormwater (clean and dirty) runoff, and downstream impacts from erosion/spillage.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Service Water Reticulation System (Pipelines)	Simunye Shaft Complex	Sterilisation, loss of in-situ soil utilisation potential along reticulation line, de-nutrification and loss of fertility on stored materials. Possible contamination from dirty water runoff on stored and in-situ soils along linear infrastructure and service road. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soil over footprint servitude of pipelines and associated infrastructure. Possible erosion (wind and water) and compaction of unprotected (de- vegetated) sites.	Manage and control of footprint area (Minimise Water Management and associated infrastructure), stormwater controls (berms, channels), erosion (water) and compaction along water servitudes (pipeline and service road).	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage linear footprint of disturbance, and stability of soil berms (stored/stockpiled utilisable soils), management of stormwater (clean and dirty) runoff, and downstream impacts from erosion/spillage.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



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Storm Water Berms and Canals	Simunye Shaft Complex	Reduction of Runoff (volume) to Natural Resource - Sterilisation, loss of in-situ soil utilisation potential, de- nutrification or loss of stored soil fertility, contamination from dirty water runoff. Change of land capability and land use.	On-going sterilisation of in- situ and stripped/stored (berms) soils associated with footprint to stormwater control berms and channels. Possible erosion (water leakage) of unprotected (de- vegetated) sites.	Manage and control of footprint area (Minimise Stormwater Management Systems - berms, channels and dams) and design for attenuation of clean water runoff and effects of erosion.	Contain footprint area to minimum and manage erosion, compaction and stormwater controls (dirty water contamination).	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Monitor and Manage footprint of disturbance for dirty water ingress, stormwater (clean and dirty) runoff and downstream impacts of erosion on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Sewage Treatment Plant	Simunye Shaft Complex	Sludge Drying Beds - Sterilisation and loss of in-situ soil utilisation potential on infrastructural footprint, de- nutrification/loss of fertility and possible contamination from dirty water runoff and sewage water spillage stored and in-situ soils. Change of land capability and land use.	On-going sterilisation of in- situ and stored soils associated with footprint to Sewage Works and associated infrastructure. Possible erosion (water leakage) of unprotected (de- vegetated) sites and contamination by unprocessed sewage leakage/runoff.	Manage and control of footprint area (Sewage Works), stormwater controls (berms, channels) and potential for contamination from dirty water runoff and outflow of untreated waist water.	Contain footprint area to minimum and manage stormwater controls (dirty water contamination) and impact of untreated sewage discharge on receiving environment.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils), manage sewage treatment works and drying beds and control stormwater (clean and dirty) runoff and downstream impacts on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Storage Yard (Temporary storage of general, domestic and industrial waste)	Simunye Shaft Complex	Movement of Vehicles, Material Transport, Storage of Materials - Sterilisation and loss of in-situ soil utilisation potential on footprint, de- nutrification/loss of fertility and contamination from dirty water runoff and hydrocarbon spillage on stored soils. Change of land capability and land use.	Temporary sterilisation and loss of soil and utilisation potential and possibility erosion, compaction and contamination of in-situ and stored soils due to dirty water runoff, dust and the operation of vehicles.	Manage and control footprint area (Minimise Laydown area and confine to sass small a footprint as possible) stormwater controls (berms, channels and dams) and contamination of in-situ and/or stored soils by dirty water runoff.	Contain footprint area to minimum and manage stormwater controls (dirty water contamination) and impact of Industrial/Domestic Waste on receiving environment.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils), manage stormwater runoff (clean and dirty separation) and downstream impacts of hazardous waste on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
Storage Yard (Temporary storage of hazardous waste)	Simunye Shaft Complex	Movement of Vehicles, Material Transport, Storage of Materials - Sterilisation and loss of in-situ soil utilisation potential on footprint, de- nutrification/loss of fertility and contamination from dirty water runoff and hydrocarbon spillage on stored soils. Change of land capability and land use.	Temporary sterilisation and loss of soil and utilisation potential, the possibility for erosion, compaction and contamination of in-situ and stored soils due to dirty water (hazardous hydrocarbon and/or reagents) runoff, dust and the operation of vehicles.	Manage and control footprint area (Minimise Laydown area and confine to sass small a footprint as possible) stormwater controls (berms, channels and dams) and contamination of in-situ and/or stored soils by hazardous materials.	Contain footprint area to minimum and manage stormwater controls (dirty water contamination) and impact of Hazardous Waste on receiving environment.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of material stockpile (utilisable soils), manage stormwater runoff (clean and dirty separation) and downstream impacts of general/domestic waste on receiving environment.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



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Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
	PROPOSED ACTIVITIES										
Underground Mining (Block 8 North)	Shondoni Colliery - Block 8 North Reserve	Sterilisation, loss of in-situ soil utilisation potential and de- nutrification on areas of subsidence due to ponding and soil saturation. Salinisation of ponded areas and infiltration to groundwater environment. Change of land capability and land use.	Sterilisation of soil resource with possibility of contamination by operational activities - Ponding at surface due to subsidence/collaps e of underground workings, salinisation and long term loss of utilisation potential, ecosystem services and food security.	Design and control of mining method and geotechnical considerations to minimise potential for collapse of underground works. Management of subsidence and ponding of water at surface.	Evaluate and design, monitor and rehabilitate timeously. Contain footprint area to minimum and manage ponding, ingress and erosion.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Monitor and Manage footprint of disturbance (possible subsidence) and rehabilitate. Manage stormwater (clean and dirty) runoff and downstream impacts from infiltration and/or saturation due to ponding within areas of subsidence.	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if impacts occur.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).			
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of soil fertility and possible contamination from dirty water runoff and hydrocarbon/rea gent spillage from mining equipment on in- situ and stored soils. Change of land capability and land use	The sterilisation of soil resource and utilization potential due to operation of mining infrastructure (Vent Shaft Complex. Erosion, compaction and possible contamination of stored and in-situ materials due to dirty water runoff, hydrocarbon, coal product and reagent spills.	Manage and control footprint area, stormwater controls (berms, dams and channels) and potential for contamination.	Contain footprint area to minimum and manage contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of soil berms/stockpile (utilisable soils), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination (dirty water and hydrocarbons).	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).			



			OPERA	TIONAL PHASE- SOILS, LA	AND CAPABILITY & LAND	USE		
Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of soil fertility and possible contamination from dirty water runoff and hydrocarbon/rea gent spillage from mining equipment on in- situ and stored soils. Change of land capability and land use	The sterilisation of soil resource and utilization potential due to operation of mining infrastructure (Vent Shaft Complex. Erosion, compaction and possible contamination of stored and in-situ materials due to dirty water runoff, hydrocarbon, coal product and reagent spills.	Manage and control footprint area, stormwater controls (berms, dams and channels) and potential for contamination.	Contain footprint area to minimum and manage contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of soil berms/stockpile (utilisable soils), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination (dirty water and hydrocarbons).	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of soil fertility and possible contamination from dirty water runoff and hydrocarbon/rea gent spillage from mining equipment on in- situ and stored soils. Change of land capability and land use	The sterilisation of soil resource and utilization potential due to operation of mining infrastructure (Vent Shaft Complex. Erosion, compaction and possible contamination of stored and in-situ materials due to dirty water runoff, hydrocarbon, coal product and reagent spills.	Manage and control footprint area, stormwater controls (berms, dams and channels) and potential for contamination.	Contain footprint area to minimum and manage contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of soil berms/stockpile (utilisable soils), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination (dirty water and hydrocarbons).	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



			OPERA	TIONAL PHASE- SOILS, LA	AND CAPABILITY & LAND	USE		
Project Activity	Location	Environmental Aspect	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Sterilisation and loss of in-situ soil utilisation potential, de- nutrification/loss of soil fertility and possible contamination from dirty water runoff and hydrocarbon/rea gent spillage from mining equipment on in- situ and stored soils. Change of land capability and land use.	The sterilisation of soil resource and utilization potential due to operation of mining infrastructure (Vent Shaft Complex. Erosion, compaction and possible contamination of stored and in-situ materials due to dirty water runoff, hydrocarbon, coal product and reagent spills.	Manage and control footprint area, stormwater controls (berms, dams and channels) and potential for contamination.	Contain footprint area to minimum and manage contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Manage footprint of disturbance, and stability of soil berms/stockpile (utilisable soils), manage stormwater (clean and dirty) runoff and downstream impacts from erosion (water and wind) and contamination (dirty water and hydrocarbons).	Ongoing - Pre Decommissioning and Closure. Concurrent rehabilitation if no longer needed.	Best Practice Environmental Option (BPEO): - Delineation and restriction on impact footprint size (erosion, loss of resource/sterilisation and de-nutrification) and management of traffic movement over unprotected soils (compaction, erosion and contamination).



			OPER	ATIONAL PHASE - GE	DLOGY					
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
			SHO	ONDONI SHAFT COMP	LEX					
Underground Mining (Shondoni Shaft)	Shondoni Shaft Complex	Geology: Lithology	Changes in lithology due to mining from the underground workings	Control through mining as per approved Mining Work Programme and Mine Layout Plan	Survey department to update mine plans regularly and provide the draft / GIS department with the mine plans and methods	MHSA Regulations Section 17	Throughout entire life of mine	Detailed plans and drawings of the mine workings and methods used		
	SIMUNYE SHAFT COMPLEX									
Underground Mining (Simunye Shaft)	Simunye Shaft Complex	Geology: Lithology	Changes in lithology due to mining from the underground workings	Control through mining as per approved Mining Work Programme and Mine Layout Plan	Survey department to update mine plans regularly and provide the draft / GIS department with the mine plans and methods	MHSA Regulations Section 17	Throughout entire life of mine	Detailed plans and drawings of the mine workings and methods used		
			F	PROPOSED ACTIVITIE	S					
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Geology: Lithology	Changes in lithology due to mining from the underground workings	Control through mining as per approved Mining Work Programme and Mine Layout Plan	Survey department to update mine plans regularly and provide the draft / GIS department with the mine plans and methods	MHSA Regulations Section 17	Throughout entire life of mine	Detailed plans and drawings of the mine workings and methods used		

Table 5.2(e): Operational Phase Impact Management Measures Table - Geology



	OPERATIONAL PHASE - GROUNDWATER											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				SHONDONI SHAFT CO	MPLEX		•	•				
Offices, Workshops and Changehouses	Shondoni Shaft Complex	Groundwater quantity and quality	Servicing and Washing of Mining Equipment/ Vehicles. Insignificant impact on groundwater due to relative small area / measures implemented.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan.	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives				
Fuel & Oil Storage	Shondoni Shaft Complex	Groundwater quantity and quality	The storage of diesel fuel in storage tanks can lead to groundwater pollution due to spillages/leaks. No impact on groundwater availability.	Ensure that diesel tanks are placed in industry-standard bunkers with the appropriate lining systems to prevent the leakage of any diesel spill away from the bunker.	All spillages must be captured inside the bunded areas before any spillage to the surrounding environment takes place. Suitably qualified personnel will be responsible for the clean- up of any diesel spills of any size and nature.	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives				
Man and Material Shaft Infrastructure	Shondoni Shaft Complex	Groundwater quantity and quality	Depletion in groundwater availability and deterioration of groundwater quality in the Shaft as a result of groundwater seepage during the operation of the shaft complex. The shaft complex will be sealed/grouted, so little to no impact will take place.	Prevent influx of groundwater into the shaft complex.	Grout/seal influx zones and pump seepage water to the Storm Water Pollution Control Dam (SWPCD).	WUL Section 21(a), Taking water from a water resource.	During the operational phase of the Man and Material Shaft.	Detailed plans and drawings of the development.				
Ventilation Shaft	Shondoni Shaft Complex	Groundwater quantity and quality	Depletion in groundwater availability and deterioration of groundwater quality in the Shaft as a result of groundwater seepage during the operation of the shaft complex. The shaft complex will be sealed/grouted, so little to no impact will take place.	Prevent influx of ground water into the shaft complex.	Grout/seal influx zones and reuse or pump seepage water to the Storm Water Pollution Control Dam (SWPCD) or underground storage compartments.	WUL Section 21(a), Taking water from a water resource.	During the operational phase of the Ventilation Shaft.	Detailed plans and drawings of the development.				

Table 5.2(f): Operational Phase Impact Management Measures Table – Groundwater



	OPERATIONAL PHASE - GROUNDWATER											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people - Section 21 (j). Any water removed from the No.4 Coal seam will be deemed polluted and stored in other sections of mined out areas. A detailed mine optimisation plan has been designed to create the necessary storage of water in mined out areas for the total Life of Mine.	Optimise storage space in old underground units to prevent the need to pump water from underground mine workings to the Storm Water Pollution Control Dam (SWPCD).	Manage the operational phase water balance responsibly to reduce water make and optimise underground storage space available.	Shondoni EMP / IWWMP	During the operational phase	Groundwater quality to be complaint with resource quality objectives				
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	The influx of groundwater recharge into mine workings due to bord and pillar mining.	Manage the influx of normal groundwater recharge as part of the operational phase water balance.	Manage the operational phase water balance responsibly to reduce water make and optimise underground storage space available.	Shondoni EMP / IWWMP	During the operational phase	Groundwater quality to be complaint with resource quality objectives				
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	Depletion of external users' groundwater resources and fountains due to bord and pillar mining activities.	Monitor all external users' boreholes for 1) yield and 2) quality deterioration, based on a structured monitoring protocol.	Supply external users with supplementary water in the cases where a mining- related impact can be proven.	WUL issued to the mine.	During the operational phase	Maintain external users supply.				
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	Depletion of stream base flow due to sub-surface subsidence.	Ensure stable mining below surface water resources to minimize sub- surface subsidence.	Avoid pillar extraction activities below surface streams or obtain rock- mechanical evidence that no surface subsidence will take place.	WUL issued to the mine.	During the operational phase	Detailed mine plans.				



			OPER	ATIONAL PHASE - GRO	UNDWATER			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Underground Mining	Shondoni Shaft Complex	Groundwater quality	Groundwater recharge to underground mining units that remains in reservoirs will come in contact with coal pillars, mine floors and roofs. A gradual deterioration in groundwater quality will take place over time, depending amongst other things, residence times, natural buffer capacity and mixing ratios of groundwater from different sources.	The deterioration of groundwater in underground units is a given. The migration of polluted groundwater will be avoided by managing the water in underground storage compartments.	Monitor underground groundwater qualities on a quarterly basis. Prevent the mixing of poor and good quality water in the same reservoir - rather keep in separate reservoirs.	N/A	During the operational phase	Groundwater quality to be complaint with resource quality objectives
Coal Stockpile and Throw-Out Area	Shondoni Shaft Complex	Groundwater quantity and quality	Seepage from the stockpile area can lead to groundwater pollution, if not managed correctly.	To prevent the seepage of contaminated water from the ROM stockpile entering the underlying aquifer units. water into the shaft complex.	The ROM stockpile must be operated on a lined surface. Any surface water run-off will be captured and handled as dirty water in the Surface Water Dam/PCD.	WUL Section 21(g)	During construction and maintained during the operational phase.	Groundwater quality to be complaint with resource quality objectives
Shondoni PCD	Shondoni Shaft Complex	Groundwater quantity and quality	The operation of a Storm Water Pollution Control Dam (SWPCD) that can lead to a deterioration of groundwater quality directly beneath the facility.	To prevent the seepage of contaminated water from the Storm Water Pollution Control Dam (SWPCD) entering the underlying aquifer units.	Prevent seepages and spillages of polluted water from the SWPCD by implementing the appropriate lining system. Excess run-off from the	WUL Section 21(g)	During construction and maintained during the operational phase.	Groundwater quality to be complaint with resource quality objectives
Shondoni Incline PCD	Shondoni Shaft Complex	Groundwater quantity and quality	The operation of a Incline PCD that can lead to a deterioration of groundwater quality directly beneath the facility.	To prevent the seepage of contaminated water from the Incline PCD entering the underlying aquifer units.	facility must be captured and managed as part of the operational phase water balance.	WUL Section 21(g)	During construction and maintained during the operational phase.	Groundwater quality to be complaint with resource quality objectives



			OPER	ATIONAL PHASE - GRO	UNDWATER			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Surface Service Water Reservoir	Shondoni Shaft Complex	Groundwater quality	Spillages from the Surface Service Water Reservoir system can impact on the underlying aquifer units.	To prevent the seepage/spillage of contaminated water from the Service Water Reservoir entering the underlying aquifer units.	Prevent seepages and spillages of polluted water from the Service Water Reservoir by implementing the appropriate surface water management systems. Water reticulated and managed as part of the operational phase water balance.	WUL Section 21(g)	During construction and maintained during the operational phase.	Groundwater quality to be complaint with resource quality objectives
Service Water Reticulation System (Pipelines)	Shondoni Shaft Complex	Groundwater quality	Spillages from the Service Water Reticulation System (Pipelines) can impact on the underlying aquifer units.	To prevent the seepage/spillage of contaminated water from the Service Water Reservoir entering the underlying aquifer units.	Prevent seepages and spillages of polluted water from the Service Water Reservoir by implementing the appropriate surface water management systems. Water reticulated and managed as part of the operational phase water balance.	Best Practise Guidelines with regards to containing dirty water runoff	During construction and maintained during the operational phase.	Groundwater quality to be complaint with resource quality objectives
Storm Water Berms and Canals	Shondoni Shaft Complex	Groundwater quantity and quality	Storm Water Berms and Canals will have insignificant impact on groundwater, this part of the overall water measures implemented.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan.	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives
Attenuation Dam/ Structure	Shondoni Shaft Complex	Groundwater quantity and quality	The Attenuation Dam/ Structure will have insignificant impact on groundwater, this part of the overall water measures implemented.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan.	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives



			OPER	ATIONAL PHASE - GRO	DUNDWATER			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Oil and Silt Traps	Shondoni Shaft Complex	Groundwater quality	The Attenuation Dam/ Structure will have insignificant impact on groundwater, this part of the overall water measures implemented.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan.	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives
Sewage Treatment Plant	Shondoni Shaft Complex	Groundwater quantity and quality	Sludge Drying Beds. No impact on groundwater quantity or quality.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan.	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives
Iso Yard (Temporary storage of general, domestic and industrial waste)	Shondoni Shaft Complex	Groundwater quantity and quality	No impact on groundwater availability. Quality impact will relate more to localized soil contamination.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives
Iso Yard (Temporary storage of hazardous waste)	Shondoni Shaft Complex	Groundwater quantity and quality	No impact on groundwater availability. Quality impact will relate more to localized soil contamination.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives
Capital Yard (Temporary storage of scrap metal)	Shondoni Shaft Complex	Groundwater quantity and quality	No impact on groundwater availability. Quality impact will relate more to localized soil contamination.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives



	OPERATIONAL PHASE - GROUNDWATER											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				SIMUNYE SHAFT COM	IPLEX		•	•				
Offices, Workshops and Changehouses	Simunye Shaft Complex	Groundwater quantity and quality	Servicing and Washing of Mining Equipment/ Vehicles. Insignificant impact on groundwater due to relative small area / measures implemented.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan.	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives				
Fuel Storage	Simunye Shaft Complex	Groundwater quantity and quality	The storage of diesel fuel in storage tanks can lead to groundwater pollution due to spillages/leaks. No impact on groundwater availability.	Ensure that diesel tanks are placed in industry- standard bunkers with the appropriate lining systems to prevent the leakage of any diesel spill away from the bunker.	All spillages must be captured inside the bunded areas before any spillage to the surrounding environment takes place. Suitably qualified personnel will be responsible for the clean- up of any diesel spills of any size and nature (Hazmat).	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives				
Man and Material Shaft Infrastructure	Simunye Shaft Complex	Groundwater quantity and quality	Depletion in groundwater availability and deterioration of groundwater quality in the Shaft as a result of groundwater seepage during the operational phase of the shaft complex. The shaft complex will be sealed/grouted, so little to no impact will take place.	Prevent influx of groundwater into the shaft complex.	Grout/seal influx zones and pump seepage water to the Storm Water Pollution Control Dam (SWPCD).	WUL Section 21(a), Taking water from a water resource.	During the operational phase of the Man and Material Shaft.	Detailed plans and drawings of the development.				
Ventilation Shaft	Simunye Shaft Complex	Groundwater quantity and quality	Depletion in groundwater availability and deterioration of groundwater quality in the Shaft as a result of groundwater seepage during the operational phase of the shaft complex. The shaft complex will be sealed/grouted, so little to no impact will take place.	Prevent influx of ground water into the shaft complex.	Grout/seal influx zones and reuse or pump seepage water to the Storm Water Pollution Control Dam (SWPCD) or underground storage compartments.	WUL Section 21(a), Taking water from a water resource.	During the operational phase of the Ventilation Shaft.	Detailed plans and drawings of the development.				



			OPER	ATIONAL PHASE - GRO	UNDWATER			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people - Section 21 (j). Any water removed from the No.4 Coal seam will be deemed polluted and stored in other sections of mined out areas. A detailed mine optimisation plan has been designed to create the necessary storage of water in mined out areas for the total Life of Mine.	Optimise storage space in old underground units to prevent the need to pump water from underground mine workings to the Storm Water Pollution Control Dam (SWPCD).	Manage the operational phase water balance responsibly to reduce water make and optimise underground storage space available.	Shondoni EMP / IWWMP	During the operational phase	Groundwater quality to be complaint with resource quality objectives
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	The influx of groundwater recharge into mine workings due to bord and pillar mining.	Manage the influx of normal groundwater recharge as part of the operational phase water balance.	Manage the operational phase water balance responsibly to reduce water make and optimise underground storage space available.	Shondoni EMP / IWWMP	During the operational phase	Groundwater quality to be complaint with resource quality objectives
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	Depletion of external users' groundwater resources and fountains due to bord and pillar mining activities.	Monitor all external users' boreholes for 1) yield and 2) quality deterioration, based on a structured monitoring protocol.	Supply external users with supplementary water in the cases where a mining- related impact can be proven.	WUL issued to the mine.	During the operational phase	Maintain external users supply.
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	Depletion of stream base flow due to sub-surface subsidence.	Ensure stable mining below surface water resources to minimize sub- surface subsidence.	Avoid pillar extraction activities below surface streams or obtain rock- mechanical evidence that no surface subsidence will take place.	WUL issued to the mine.	During the operational phase	Detailed mine plans.



			OPER	ATIONAL PHASE - GRO	DUNDWATER			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Underground Mining	Shondoni Shaft Complex	Groundwater quality	Groundwater recharge to underground mining units that remains in reservoirs will come in contact with coal pillars, mine floors and roofs. A gradual deterioration in groundwater quality will take place over time, depending amongst other things, residence times, natural buffer capacity and mixing ratios of groundwater from different sources.	The deterioration of groundwater in underground units is a given. The migration of polluted groundwater will be avoided by managing the water in underground storage compartments.	Monitor underground groundwater qualities on a quarterly basis. Prevent the mixing of poor and good quality water in the same reservoir - rather keep in separate reservoirs.	N/A	During the operational phase	Groundwater quality to be complaint with resource quality objectives
Service Water Dam (Top)	Simunye Shaft Complex	Groundwater quantity and quality	The operation of the Service Water Dam can lead to a deterioration of groundwater quality directly beneath the facility.	To prevent the seepage of contaminated water from the Incline the Service Water Dam entering the underlying aquifer units.	Prevent seepages and spillages of polluted water from the Service Water Dam by implementing the appropriate lining system. Manage water contained ss part of the operational phase water balance.	WUL Section 21(g)	During construction and maintained during the operational phase.	Groundwater quality to be complaint with resource quality objectives
Service Water Dam (Bottom)	Simunye Shaft Complex	Groundwater quantity and quality	The operation of the Service Water Dam can lead to a deterioration of groundwater quality directly beneath the facility.	To prevent the seepage of contaminated water from the Incline the Service Water Dam entering the underlying aquifer units.	Prevent seepages and spillages of polluted water from the Service Water Dam by implementing the	WUL Section 21(g)	During construction and maintained during the operational phase.	Groundwater quality to be complaint with resource quality objectives
Service Water Reticulation System (Pipelines)	Simunye Shaft Complex	iye ft Groundwater ilex quality	Spillages from the Service vater Water Reticulation System y (Pipelines) can impact on the underlying aquifer units.	To prevent the seepage/spillage of contaminated water from the Service Water Reservoir entering the underlying aquifer units.	appropriate lining system. Manage water contained ss part of the operational phase water balance.	Best Practise Guidelines with regards to containing dirty water runoff	During construction and maintained during the operational phase.	Groundwater quality to be complaint with resource quality objectives



	OPERATIONAL PHASE - GROUNDWATER											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Storm Water Berms and Canals	Simunye Shaft Complex	Groundwater quantity and quality	Storm Water Berms and Canals will have insignificant impact on groundwater, this part of the overall water measures implemented.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan.	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives				
Sewage Treatment Plant	Simunye Shaft Complex	Groundwater quantity and quality	Sludge Drying Beds. No impact on groundwater quantity or quality.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan.	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives				
Storage Yard (Temporary storage of general, domestic and industrial waste)	Simunye Shaft Complex	Groundwater quantity and quality	No impact on groundwater availability. Quality impact will relate more to localized soil contamination.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives				
Storage Yard (Temporary storage of hazardous waste)	Simunye Shaft Complex	Groundwater quantity and quality	No impact on groundwater availability. Quality impact will relate more to localized soil contamination.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives				



			OPER	ATIONAL PHASE - GRO	DUNDWATER			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
				PROPOSED ACTIVI	ГIES			
Underground Mining (Block 8 North)	Shondoni Colliery - Block 8 North Reserve	Groundwater quantity and quality	Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people - Section 21 (j). Any water removed from the No.4 Coal seam will be deemed polluted and stored in other sections of mined out areas. A detailed mine optimisation plan has been designed to create the necessary storage of water in mined out areas for the total Life of Mine.	Optimise storage space in old underground units to prevent the need to pump water from underground mine workings to the Storm Water Pollution Control Dam (SWPCD).	Manage the operational phase water balance responsibly to reduce water make and optimise underground storage space available.	Shondoni EMP / IWWMP	During the operational phase	Groundwater quality to be complaint with resource quality objectives
Underground Mining (Block 8 North)	Shondoni Colliery - Block 8 North Reserve	Groundwater quantity and quality	The influx of groundwater recharge into mine workings due to bord and pillar mining.	Manage the influx of normal groundwater recharge as part of the operational phase water balance.	Manage the operational phase water balance responsibly to reduce water make and optimise underground storage space available.	Shondoni EMP / IWWMP	During the operational phase	Groundwater quality to be complaint with resource quality objectives
Underground Mining (Block 8 North)	Shondoni Colliery - Block 8 North Reserve	Groundwater quantity and quality	Depletion of external users' groundwater resources and fountains due to bord and pillar mining activities.	Monitor all external users' boreholes for 1) yield and 2) quality deterioration, based on a structured monitoring protocol.	Supply external users with supplementary water in the cases where a mining- related impact can be proven.	WUL issued to the mine.	During the operational phase	Maintain external users supply.
Underground Mining (Block 8 North)	Shondoni Colliery - Block 8 North Reserve	Groundwater quantity and quality	Depletion of stream base flow due to sub-surface subsidence.	Ensure stable mining below surface water resources to minimize sub- surface subsidence.	Avoid pillar extraction activities below surface streams or obtain rock- mechanical evidence that no surface subsidence will take place.	WUL issued to the mine.	During the operational phase	Detailed mine plans.



	OPERATIONAL PHASE - GROUNDWATER											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Underground Mining (Block 8 North)	Shondoni Colliery - Block 8 North Reserve	Groundwater quality	Groundwater recharge to underground mining units that remains in reservoirs will come in contact with coal pillars, mine floors and roofs. A gradual deterioration in groundwater quality will take place over time, depending amongst other things, residence times, natural buffer capacity and mixing ratios of groundwater from different sources.	The deterioration of groundwater in underground units is a given. The migration of polluted groundwater will be avoided by managing the water in underground storage compartments.	Monitor underground groundwater qualities on a quarterly basis. Prevent the mixing of poor and good quality water in the same reservoir - rather keep in separate reservoirs.	N/A	During the operational phase	Groundwater quality to be complaint with resource quality objectives				
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Groundwater quantity and quality	Depletion in groundwater availability and deterioration of groundwater quality in the Shaft as a result of groundwater seepage during the operational phase of the shaft complex. The shaft complex will be sealed/grouted, so little to no impact will take place.	Prevent influx of ground water into the shaft complex.	Grout/seal influx zones and reuse or pump seepage water to underground storage compartments.	WUL Section 21(a), Taking water from a water resource.	During the operational phase of the Ventilation Shaft.	Detailed plans and drawings of the development.				
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Groundwater quantity and quality	Depletion in groundwater availability and deterioration of groundwater quality in the	Prevent influx of ground water into the shaft complex.	Grout/seal influx zones and reuse or pump seepage water to underground storage compartments.	WUL Section 21(a), Taking water from a water resource.	During the operational phase of the Ventilation Shaft.	Detailed plans and drawings of the development.				
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Groundwater quantity and quality	Shaft as a result of groundwater seepage during the operational phase of the shaft complex. The shaft complex will be sealed/grouted, so little to no impact will take place.	Prevent influx of ground water into the shaft complex.	Grout/seal influx zones and reuse or pump seepage water to underground storage compartments.	WUL Section 21(a), Taking water from a water resource.	During the operational phase of the Ventilation Shaft.	Detailed plans and drawings of the development.				



	OPERATIONAL PHASE - GROUNDWATER										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Groundwater quantity and quality	Depletion in groundwater availability and deterioration of groundwater quality in the Shaft as a result of groundwater seepage during the operational phase of the shaft complex. The shaft complex will be sealed/grouted, so little to no impact will take place.	Prevent influx of ground water into the shaft complex.	Grout/seal influx zones and reuse or pump seepage water to underground storage compartments.	WUL Section 21(a), Taking water from a water resource.	During the operational phase of the Ventilation Shaft.	Detailed plans and drawings of the development.			



			OPE	RATIONAL PHASE - SU	RFACE WATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
				SHONDONI SHAFT C	OMPLEX			
Offices, Workshops and Changehouses	Shondoni Shaft Complex	Surface Water quality	Servicing and Washing of Mining Equipment/ Vehicles. Insignificant impact on catchment yield due to relative small area	Control by developing and implementing an integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan	Best Practice Guidelines with regards to containing dirty water runoff	During the operational phase	Surface water quality to be compliant with resource quality objectives
Conveyor System	Shondoni Shaft Complex	Surface Water quality	Conveyance of Coal. Potential impact on water quality due to spillage of coal from overloaded conveyors and at transfer stations	Control by containing and cleaning spillage along conveyor system and transfer stations regularly	Intercept and contain dirty water as per the water management plan	Best Practice Guidelines with regards to containing dirty water runoff	During the operational phase	Surface water quality to be compliant with resource quality objectives
Underground Mining	Shondoni Shaft Complex	Surface Water quantity	Mining of Coal Seams, Surface Subsidence, Gas Accumulation, Generation of Acid Mine Drainage.	Ensure no future high extraction in areas within the 1:100 year flood zones of streams and rivers	Ensure that high extraction of coal does not occur in areas below the 1:100 year flood zones	Chamber of Mines and Best Practice Guidelines	During the operational phase	Existence of stable landforms and free- draining surfaces
Topsoil/ Overburden Stockpile	Shondoni Shaft Complex	Surface Water quantity	Storage of Topsoil/ Overburden. Loss of catchment yield due to cutting off storm water flow paths.	Avoid by providing free drainage at topsoil & overburden stockpiles	Ensure free flowing drainage at stockpile areas	Best Practice Guidelines	During the operational phase	No visible signs of surface water ponding
Coal Storage in Surface Bunker	Shondoni Shaft Complex	Surface Water quality	Storage of Coal. Impact on water quality due to spillage of contact water from bunker area	Avoid through ensuring that coal storage do not exceed design capacity of bunkers	Storage area to include a bundwall to contain any spillages that could occur	Operating and maintenance manual	During the operational phase	No spillages beyond bundwall

Table 5.2(g): Operational Phase Impact Management Measures Table – Surface Water



			OPE	RATIONAL PHASE - SU	RFACE WATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Coal Stockpile and Throw-Out Area	Shondoni Shaft Complex	Surface Water quality	Storage of Coal. Impact on water quality: - Contamination of runoff water - Seepage from the PCDs - Risk of spill from the PCDs	Avoid by ensuring contaminated water is diverted to and contained in PCD's and PCD's buffer capacity is maintained	Intercept and contain dirty water in PCD's with sufficient buffer capacity as per the water management plan	Operating and maintenance manual	During the operational phase	PCD's not allowed to spill more than 1:50 years recurrence event
Shondoni PCD	Shondoni Shaft Complex	Surface Water quality	Storage of Service Water. Impact on water quality: - Contamination of runoff water - Seepage from the PCDs - Risk of spill from the PCDs	Avoid by ensuring contaminated water is diverted to and contained in PCD and buffer storage capacity is maintained	Intercept and contain dirty water in PCD's with sufficient buffer capacity as per the water management plan	Operating and maintenance manual	During the operational phase	PCD's not allowed to spill more than 1:50 years recurrence event
Shondoni Incline PCD	Shondoni Shaft Complex	Surface Water quality	Storage of Service Water. Impact on water quality: - Contamination of runoff water - Seepage from the PCDs - Risk of spill from the PCDs	Avoid by ensuring contaminated water is diverted to and contained in PCD and buffer storage capacity is maintained	Intercept and contain dirty water in PCD's with sufficient buffer capacity as per the water management plan	Operating and maintenance manual	During the operational phase	PCD's not allowed to spill more than 1:50 years recurrence event
Storm Water Berms and Canals	Shondoni Shaft Complex	Surface Water quantity	Reduction of Runoff to Natural Resource. Impact on quantity is negligible due to relative small areas isolated by means of storm water diversion berms and canals draining to PCDs.	Control by developing and implementing an integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan	Operating and maintenance manual	During the operational phase	Impact restricted to development footprint area and appropriate buffer zone



			OPE	RATIONAL PHASE - SU	RFACE WATER							
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
	SIMUNYE SHAFT COMPLEX											
Offices, Workshops and Changehouses	Simunye Shaft Complex	Surface Water quality	Servicing and Washing of Mining Equipment/ Vehicles. Insignificant impact on catchment yield due to relative small area	Control by developing and implementing an integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan	Best Practice Guidelines with regards to containing dirty water runoff	During the operational phase	Surface water quality to be compliant with resource quality objectives				
Underground Mining	Simunye Shaft Complex	Surface Water quantity	Mining of Coal Seams, Surface Subsidence, Gas Accumulation, Generation of Acid Mine Drainage.	Ensure no future high extraction in areas within the 1:100 year flood zones of streams and rivers	Ensure that high extraction of coal does not occur in areas below the 1:100 year flood zones	Chamber of Mines and Best Practice Guidelines	During the operational phase	Existence of stable landforms and free- draining surfaces				
Topsoil/ Overburden Stockpile	Simunye Shaft Complex	Surface Water quantity	Storage of Topsoil/ Overburden. Loss of catchment yield due to cutting off storm water flow paths.	Avoid by providing free drainage at topsoil & overburden stockpiles	Ensure free flowing drainage at stockpile areas	Best Practice Guidelines	During the operational phase	No visible signs of surface water ponding				
Service Water Dam (Top) &Service Water Dam (Bottom)	Simunye Shaft Complex	Surface Water quality	Storage of Service Water. Impact on water quality: - Contamination of runoff water - Seepage from the PCDs - Risk of spill from the PCDs	Avoid by ensuring PCD buffer storage capacity is maintained	Intercept and contain dirty water in PCD's with sufficient buffer capacity as per the water management plan	Operating and maintenance manual	During the operational phase	PCD's not allowed to spill more than 1:50 years recurrence event				


			OPE	RATIONAL PHASE – SU	RFACE WATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Management Objective/ Measures Outcome)		Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Storm Water Berms and Canals	Simunye Shaft Complex	Surface Water quantity	Reduction of Runoff to Natural Resource. Impact on quantity is negligible due to relative small areas isolated by means of storm water diversion berms and canals draining to PCDs	Control by developing and implementing an integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan	Operating and maintenance manual	During the operational phase	Impact restricted to development footprint area and appropriate buffer zone
				PROPOSED ACTIV	ITIES			
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Surface Water quantity	Mining of Coal Seams, Surface Subsidence, Gas Accumulation, Generation of Acid Mine Drainage	Ensure no future high extraction in areas within the 1:100 year flood zones of streams and rivers	Ensure that high extraction of coal does not occur in areas below the 1:100 year flood zones	Chamber of Mines and Best Practice Guidelines	During the operational phase	Existence of stable landforms and free- draining surfaces



	OPERATIONAL PHASE - PLANT LIFE (FLORA)											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
SHONDONI SHAFT COMPLEX												
Access Roads	Shondoni	All areas of Natural Habitat crossed by Access Roads	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species. Monthly inspections of the road verges, focussing on areas of bare soil where plants can get established. Control of any population of invasive species	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Life of Mine	No established populations of alien invasive species at the end of each annual audit.				
	Complex		Degradation of Natural Habitat		Regular wetting of dirt road surfaces during dry season (May – Nov).							
		All areas of Natural Habitat crossed by	(listed Threatened Ecosystem &	Minimisation - reduction of dust production along	No wetting of dirt road surfaces during wet season (Dec - Apr).	-	Life of Mine	vegetation along road verges as a result of excess dust production.				
		Access Roads	CBAs) through excess dust production	access roads	Maximum speed limit of 40 km/hr.							
Security Fence & Access, Offices, Workshops & Changehouses, Internal Roads & Parking Areas, Man and Material Shaft	Shondoni	Areas of Natural Habitat	Establishment of populations	Minimisation - alien plant	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species.	NEMBA (10/2004); Alien and	Life of Mine	No established populations of alien invasive				
Ventilation Shaft, Potable Water Reservoir,	Complex	adjacent to of inva Infrastructure plant	of invasive alien plant species	eradication and management	Monthly inspections of areas of bare soil adjacent to infrastructure where plants can get established.	Invasive Species Regulations, 2014	Life of Mille	species at the end of each annual audit.				
Structure, Storm Water Berms and Canals					Control of any population of invasive species by alien plant control team.							

Table 5.2(h): Operational Phase Impact Management Measures Table – Plant Life (Flora)



	OPERATIONAL PHASE - PLANT LIFE (FLORA)												
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved					
Fuel & Oil Storage, Explosives Off-Load Area, Coal storage (Surface Bunker), Coal Stockpile & Throw-Out Area, Stonedust Dump, Shondoni PCD & Incline PCD, Surface Service Water Reservoir, Capital Yard, Iso Yard, Sewage Treatment Plant, Oil & Silt	Shondoni Shaft Complex	Areas of Natural Habitat adjacent to Infrastructure	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species. Monthly inspections of areas of bare soil adjacent to infrastructure where plants can get established. Control of any population of invasive species by alien plant control team.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Life of Mine	No established populations of alien invasive species at the end of each annual audit.					
Traps Underground Mining	Shondoni Shaft Complex	Areas of Natural Habitat	Degradation of Natural Habitat (listed Threatened Ecosystem and CBAs) through potential subsidence	Minimisation - control of alien plants in areas of subsidence	Inspection of any reported areas of subsidence to ensure that no bare soil has been exposed. Monthly inspection of areas of bare soil where alien plants can get established. Control of any population of invasive species by alien plant control team.	NEMBA (10/2004)	Life of Mine	No established populations of alien invasive species at the end of each annual audit.					
Topsoil/ Overburden Stockpile	Shondoni Shaft Complex	Areas of Natural Habitat adjacent to Infrastructure	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species. Monthly inspections of the topsoil stockpiles.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Life of Mine	No established populations of alien invasive species at the end of each annual audit.					



				OPERATIONAL P	HASE – PLANT LIFE (FLORA)			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
				SIMUNY	E SHAFT COMPLEX			
Access Roads		All areas of Natural Habitat crossed by	Establishment of populations of invasive alien	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species.	NEMBA (10/2004); Alien and Invasive Species	Life of Mine	No established populations of alien invasive species at the
	Simunye Shaft	Access Roads	plant species		Monthly inspections of the road verges, focussing on areas of bare soil where plants can get established.	Regulations, 2014		end of each annual audit.
	Complex				Control of any population of invasive species by alien plant control team.			
		All areas of	Degradation of Natural Habitat (listed	Minimisation -	Regular wetting of dirt road surfaces during dry season (May – Nov).			achieved No established populations of alien invasive species at the end of each annual audit. No die-off of vegetation along road verges as a result of excess dust production. No established populations of alien invasive species at the end of each annual audit.
		Natural Habitat crossed by	Threatened Ecosystem &	reduction of dust production along	No wetting of dirt road surfaces during wet season (Dec - Apr).	-	Life of Mine	vegetation along road verges as a result of excess
		Access Roads	CBAs) through excess dust production	access roads	Maximum speed limit of 40 km/hr.			dust production.
Security Fence and Access, Offices, Workshops and Changehouses, Internal Roads and Parking Areas, Man and Material Shaft Infrastructure,	Simunye	Areas of Natural Habitat	Establishment	Minimisation - alien plant	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species.	NEMBA (10/2004); Alien and		No established populations of alien invasive
Infrastructure, Ventilation Shaft, Potable Water Reservoir, Attenuation Dam/	Shaft Complex	adjacent to Infrastructure	of invasive alien plant species	eradication and management	Monthly inspections of areas of bare soil adjacent to infrastructure where plants can get established.	Invasive Species Regulations, 2014	Life of Mine	species at the end of each annual audit.
Structure, Storm Water Berms and Canals, Service Water Dam (Top & Bottom)					Control of any population of invasive species by alien plant control team.			



				OPERATIONAL P	HASE – PLANT LIFE (FLORA)			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Fuel & Oil Storage, Stonedust Dump, Storage Yard (Temporary storage of hazardous waste), Storage Yard (Temporary storage of general, domestic	Simunye Shaft	Areas of Natural Habitat	Establishment of populations	Minimisation - alien plant	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species.	NEMBA (10/2004); Alien and Invasiva Spacies	Life of Mine	No established populations of alien invasive
of general, domestic and industrial waste), Sewage	Complex	Infrastructure	plant species	management	Monthly inspections of areas of bare soil adjacent to infrastructure where plants can get established.	Regulations, 2014		end of each annual audit.
Treatment Plant, Oil and Silt Traps					Control of any population of invasive species by alien plant control team.			
			Degradation of Natural Habitat (listed	Minimisation -	Inspection of any reported areas of subsidence to ensure that no bare soil has been exposed.			No established populations of alien invasive species at the end of each
Underground Mining	Simunye Shaft Complex	Areas of Natural Habitat	tat Ecosystem and CBAs) through potential subsidence	control of alien plants in areas of subsidence	Weekly inspection of areas of bare soil where alien plants can get established.	NEMBA (10/2004)	Life of Mine	
	- r				Control of any population of invasive species by alien plant control team.			annual audit.
Topsoil/ Overburden Stockpile	Simunye Shaft Complex	Areas of Natural Habitat adjacent to Infrastructure	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Life of Mine	No established populations of alien invasive species at the end of each annual audit.
					Monthly inspections of the topsoil stockpiles.			
		T	Γ	PROP	OSED ACTIVITIES	T	Γ	
Underground Mining (New Block 8 North)	Shondoni		Degradation of Natural Habitat (listed	Minimisation -	Inspection of any reported areas of subsidence to ensure that no bare soil has been exposed.			No established populations of
	New Block 8 North	Colliery – Areas of ew Block Natural Habitat	(listed Threatened at Ecosystem and p CBAs) through	control of alien plants in areas of subsidence	Monthly inspection of areas of bare soil where alien plants can get established.	NEMBA (10/2004)	Life of Mine	alien invasive species at the
	Reserve		potential subsidence		Control of any population of invasive species by alien plant control team.			annual audit.



	OPERATIONAL PHASE – PLANT LIFE (FLORA)											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
West Upcast and Downcast Ventilation Shafts & North Upcast and Downcast Ventilation Shafts	Shondoni Colliery - Farm Brakspruit 359 IR Portions 8 & 11	Cultivated Lands adjacent to shafts	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species. Monthly inspections of areas of bare soil adjacent to infrastructure where plants can get established. Control of any population of invasive species by alien plant control team.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Life of Mine	No established populations of alien invasive species at the end of each annual audit.				



			OPERATIO	NAL PHASE – ANIMAL LIFE	(FAUNA)						
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
SHONDONI SHAFT COMPLEX											
Access Roads	Shondoni Shaft Complex	Populations of fauna Species of Conservation Concern (SCC)	Disturbance or loss of populations of fauna Species of Conservation Concern (SCC)	Minimisation -reduction of driving speed and night driving along access roads	Maximum speed limit of 40km/hr. Only essential staff to be permitted to drive on access roads at night.	NEMBA (10/2004)	Life of Mine	No mortalities of any fauna SCC through collisions with vehicles			
Security Fence and Access, Offices, Workshops and Changehouses, Internal Roads and Parking Areas, Man and Material Shaft Infrastructure, Ventilation Shaft, Potable Water Reservoir, Attenuation Dam/ Structure, Storm Water Berms and Canals	Shondoni Shaft Complex	Populations of fauna Species of Conservation Concern (SCC)	Disturbance or loss of populations of fauna Species of Conservation Concern through noise disturbance during operational activities	Minimisation -reduction in noise produced by operational activities	Reduce noise produced by operations to an acceptable threshold as determined by noise specialist	To be determined by noise specialist	Life of Mine	Acceptable noise threshold (as determined by noise specialist) to be consistently achieved			
Fuel & Oil Storage, Explosives Off-Load Area, Coal storage in Surface Bunker, Coal Stockpile and Throw-Out Area, Stomedust Dump, Shondoni PCD, Shondoni Incline PCD, Surface Service Water Reservoir, Capital Yard, Iso Yards, Sewage Treatment Plant, Oil and Silt Traps	Shondoni Shaft Complex	Populations of fauna Species of Conservation Concern (SCC)	Disturbance or loss of populations of fauna Species of Conservation Concern through noise disturbance during operational activities	Minimisation -reduction in noise produced by operational activities	Reduce noise produced by operations to an acceptable threshold as determined by noise specialist	To be determined by noise specialist	Life of Mine	Acceptable noise threshold (as determined by noise specialist) to be consistently achieved			
Conveyor System	Shondoni Shaft Complex	Populations of fauna Species of Conservation Concern (SCC)	Disturbance or loss of populations of fauna Species of Conservation Concern through noise disturbance during operational activities	Minimisation -reduction in noise produced by conveyors	Reduce noise produced by conveyors to an acceptable threshold as determined by noise specialist	To be determined by noise specialist	Life of Mine	Acceptable noise threshold (as determined by noise specialist) to be consistently achieved			

Table 5.2(i): Operational Phase Impact Management Measures Table – Animal Life (Fauna)



			OPERATIO	NAL PHASE – ANIMAL LIFE	(FAUNA)			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Potable Water Supply System (Pipelines), Service Water Reticulation System (Pipelines), Electricity Supply	Shondoni Shaft Complex	Populations of fauna Species of Conservation Concern (SCC)	Disturbance or loss of populations of avifauna Species of Conservation Concern through collisions with overhead transmission lines	Minimisation -reduction in risk of collisions or electrocution	Ensure that visibility of overhead transmission lines is elevated to reduce likelihood of birds perching and getting electrocuted through best practice technology.	NEMBA (10/2004)	Life of Mine	No mortalities of any fauna SCC through collisions with overhead transmission lines or electrocutions
			S	IMUNYE SHAFT COMPLEX				
Access Roads	Simunye Shaft Complex	Populations of fauna Species of Conservation Concern (SCC)	Disturbance or loss of populations of fauna Species of Conservation Concern	Minimisation -reduction of driving speed and night driving along access roads	Maximum speed limit of 40km/hr. Only essential staff to be permitted to drive on access roads at night.	NEMBA (10/2004)	Life of Mine	No mortalities of any fauna SCC through collisions with vehicles
Security Fence and Access, Offices, Workshops and Changehouses, Internal Roads and Parking Areas, Man and Material Shaft Infrastructure, Ventilation Shaft, Potable Water Reservoir, Attenuation Dam/ Structure, Storm Water Berms and Canals, Service Water Dam (Top), Service Water Dam (Bottom)	Simunye Shaft Complex	Populations of fauna Species of Conservation Concern (SCC)	Disturbance or loss of populations of fauna Species of Conservation Concern through noise disturbance during operational activities	Minimisation -reduction in noise produced by operational activities	Reduce noise produced by operations to an acceptable threshold as determined by noise specialist	To be determined by noise specialist	Life of Mine	Acceptable noise threshold (as determined by noise specialist) to be consistently achieved
Fuel & Oil Storage, Stonedust Dump, Storage Yard (Temporary storage of hazardous waste), Storage Yard (Temporary storage of general, domestic and industrial waste), Sewage Treatment Plant, Oil and Silt Traps	Simunye Shaft Complex	Populations of fauna Species of Conservation Concern (SCC)	Disturbance or loss of populations of fauna Species of Conservation Concern through noise disturbance during operational activities	Minimisation -reduction in noise produced by operational activities	Reduce noise produced by operations to an acceptable threshold as determined by noise specialist	To be determined by noise specialist	Life of Mine	Acceptable noise threshold (as determined by noise specialist) to be consistently achieved



	OPERATIONAL PHASE – ANIMAL LIFE (FAUNA)										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Potable Water Supply System (Pipelines), Service Water Reticulation System (Pipelines), Electricity Supply	Simunye Shaft Complex	Populations of fauna Species of Conservation Concern (SCC)	Disturbance or loss of populations of avifauna Species of Conservation Concern through collisions with overhead transmission lines	Minimisation -reduction in risk of collisions or electrocution	Ensure that visibility of overhead transmission lines is elevated through use of reflective devices and bird flappers. Fit pylons with anti- perching devices such as metal spikes to reduce likelihood of birds perching and getting electrocuted.	NEMBA (10/2004)	Life of Mine	No mortalities of any fauna SCC through collisions with overhead transmission lines or electrocutions			



	OPERATIONAL PHASE - AQUATIC ECOSYSTEMS												
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved					
				SHONDO	ONI SHAFT COMPLEX								
					Stormwater should discharge into grassed verges and not into wetlands or watercourses.	UATIC ECOSYSTEMS Ianagement Measures Legal Requirements/ Compliance with Standards Timeframe for Implementation St r COMPLEX ater should discharge into verges and not into wetlands rcourses. WUL, RQO, Best Practice Guidelines Throughout Operational and Decommissioning Phases No e disct storr wetla Phases protection and energy ry. WUL, RQO, Best Practice Guidelines Throughout Operational and Decommissioning Phases Dirty from Phases protection and energy ry. WUL, RQO, Best Practice Guidelines Throughout Operational and Decommissioning Phases No e down deve footp d leaks (e.g. fuel, grease and build be remediated. All ruality monitoring and itoring in receiving surses. WUL, RQO, Best Practice Guidelines Throughout Operational and Decommissioning Phases No e natu Phases use blockages and constricted WUL, RQO, Best Practice Guidelines Throughout Operational and Decommissioning Phases No e with Phases nd leaks should be prevented naged. WUL, RQO, Best Practice Guidelines Throughout Operational and Decommissioning Phases No e with Decommissioning Phases	No erosion or discharge of stormwater into wetlands or watercourses						
			Increased turbidity	Manage stormwater	Effective separation of clean and dirty water.	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	Dirty water separated from clean water					
Access Roads	Shondoni Shaft ComplexAquatic ecosystemsand sedimentation due to eroded sediments and contaminants being carried into receiving stormwater runoff.runoff, prevent erosion at stormwater dissipaters at culverts where outlets and preventErosion protection and energy dissipaters at culverts where necessary.WUL Prac GuidShondoni Shaft ComplexAquatic ecosystemsand sedimentation due to eroded sediments and contaminants being carried into receiving watercourses in stormwater runoff.runoff, prevent erosion at stormwater preventErosion protection and energy dissipaters at culverts where necessary.WUL Prac GuidSpills and leaks (e.g. fuel, grease and oils) should be remediated. All vehicles must be regularly inspected for leaks.WUL Prac Guid	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	No erosion visible downslope of development footprint									
		ecosystems	being carried into receiving watercourses in stormwater runoff.	prevent stormwater from discharging directly into wetland areas.	Spills and leaks (e.g. fuel, grease and oils) should be remediated. All vehicles must be regularly inspected for leaks.	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	No contamination of natural watercourses					
					Water quality monitoring and biomonitoring in receiving watercourses.	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	Ensure compliance with WUL and RQO					
					Roads crossings of wetlands should be regularly inspected for debris that may create blockages and constricted flows.	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	No erosion at culverts					
Offices,	Shondoni	Aquatic	Water quality impacts due to	Prevent spills and leaks by storing hazardous waste and hazardous	Spills and leaks should be prevented and managed.	WUL, WQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses due to leaks or spills					
Offices, Workshops and Changehouses	Shondoni Shaft Complex	i Aquatic ecosystems	impacts due to spills and leaks and contamination via stormwater runoff.	substances appropriately in bunded areas. Dispose of hazardous waste appropriately.	An emergency preparedness plan must be compiled that will include measures to contain and remediate any potential spill, together with post- remediation follow up and monitoring.	WUL, WQO, Best Practice Guidelines	Throughout Operational Phase	Immediate and effective response to major incidents					

Table 5.2(j): Operational Phase Impact Management Measures Table – Aquatic Ecosystems



	OPERATIONAL PHASE - AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					All staff should be trained to act appropriately in the event of a spill.							
Offices, Workshops	Shondoni	Aquatic	Water quality	Ensure oil and silt traps are	Implement all recommendations for effective separation of clean and dirty water and attenuated release of clean storm water.	WUL, WQO, Best Practice Guidelines	Throughout Operational Phase	Standard to be achieved Clean water separated from dirty water No contamination of watercourses due to leaks or spills No contamination of watercourses due to leaks or spills All waste removed from site and disposed of at correct facility No erosion or discharge of stormwater into wetlands or watercourses Dirty water separated from clean water No erosion visible downslope of development footprint No contamination of natural watercourses				
and Sn Changehouses Com	Shaft Complex	ecosystems	impacts due to spills and leaks and contamination via stormwater runoff.	maintained and function optimally.	maintained and function optimally.	maintained and function optimally.	All machinery should be well maintained to prevent leaks. Silt traps and oil separators should be regularly inspected and any faults immediately addressed.	WUL, WQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses due to leaks or spills		
					Hazardous substances and hazardous waste must be appropriately stored in bunded areas.	NEMWA, BPEO	Throughout Operational Phase	No contamination of watercourses due to leaks or spills				
					Dispose of hazardous waste and solid waste appropriately.	NEMWA, BPEO	Throughout Operational Phase	All waste removed from site and disposed of at correct facility				
					Stormwater should discharge into grassed verges and not into wetlands or watercourses.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion or discharge of stormwater into wetlands or watercourses				
			Increased turbidity and sedimentation	Manage stormwater runoff, prevent	Effective separation of clean and dirty water.	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	Dirty water separated from clean water				
Internal Roads and Parking Areas	Shondoni Shaft Complex	Aquatic ecosystems	due to eroded sediments being carried into receiving	stormwater outlets and prevent	Erosion protection and energy dissipaters at culverts where necessary.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion visible downslope of development footprint				
			watercourses in stormwater runoff.	discharging directly into wetland areas.	Spills and leaks (e.g. fuel, grease and oils) should be remediated. All vehicles must be regularly inspected for leaks.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of natural watercourses				
					Roads crossings of wetlands should be regularly inspected for debris that may create blockages and constricted flows.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion at culverts				



				OPERATIONAL PH	IASE – AQUATIC ECOSYSTEMS					
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
					Spills and leaks should be prevented and managed.	WUL, WQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses due to leaks or spills		
Fuel & Oil Storage				Prevent spills and leaks.	Prevent spills and leaks.	Prevent spills and leaks.	An emergency preparedness plan must be compiled that will include measures to contain and remediate any potential spill, together with post- remediation follow up and monitoring. All staff should be trained to act appropriately in the event of a spill.	WUL, WQO, Best Practice Guidelines	Throughout Operational Phase	Immediate and effective response to major incidents
	Shondoni Shaft Compley	Aquatic Ecosystems	Water quality impacts due to spills and leaks, via seepage and	Store oil and fuels in bunded areas.	Implement all recommendations for effective separation of clean and dirty water and attenuated release of clean storm water.	WUL, WQO, Best Practice Guidelines	Throughout Operational Phase	Clean water separated from dirty water		
	complex	stormwater runoff. Dispose of hazardous waste (including oil) appropriately in bunded areas. All machinery should be well maintained to prevent leaks. Silt traps and oil separators should be regularly inspected and any faults immediately addressed. WUL, WC	WUL, WQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses due to leaks or spills					
					Hazardous substances and hazardous waste must be appropriately stored in bunded areas.	NEMWA, BPEO	Throughout Operational Phase	No contamination of watercourses due to leaks or spills		
					Dispose of hazardous waste and solid waste appropriately.	NEMWA, BPEO	Throughout Operational Phase	All waste removed from site and disposed of at correct facility		
			Water quality		Runoff from the conveyor must be captured in the dirty water system.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses due to leaks or spills		
Conveyor System	Shondoni Shaft Complex	ni Aquatic Ecosystems ex	water quality impacts due to spills of coal fines and dust, as well as leaks from pipelines	Prevent spills from the conveyor. Channel stormwater	Pipelines carrying mine water must be regularly (weekly) monitored for leaks, which must be immediately repaired.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No major leaks		



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				runoff into dirty water system.	Coal spills from the conveyor should be minimised and contained.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses due to major spills or leaks				
	Chandani		Water quality		Where conveyors cross wetland areas, they must be enclosed.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses due to major spills or leaks				
Conveyor System	Shaft Complex	Aquatic Ecosystems	spills of coal fines and dust, as well as	Monitor pipelines for leaks and renair	Conveyor routes should be regularly inspected to detect spills, which should be immediately remediated.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses due to leaks or spills				
			pipelines	leaks immediately.	An emergency preparedness plan should be compiled to address major pipeline leaks and conveyor spills.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	Effective and timeous response to major leaks or spills				
					Water quality monitoring and biomonitoring in receiving watercourses.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO				
			Runoff from the Ventilation shaft may cause		Attenuate flows at stormwater outlets to prevent erosion.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion at stormwater outlets				
Ventilation	Shondoni	Aquatic	contamination and erosion in the tributary draining	Prevent erosion at stormwater outlets, direct	Direct stormwater away from the shaft entrance.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No loss of surface water to ground water				
Shaft	Ventilation Shondoni Shaft Ed Shaft Complex Ed	Ecosystems	into the Grootspruit. Stormwater may enter the underground workings via the shaft	stormwater away from the shaft entrance	Separate clean and dirty water.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of receiving watercourses				
Underground Mining	Shondoni Shaft Complex	Aquatic Ecosystems	Reduced flows and decrease in water quality due to loss of surface water to groundwater (ingress), drawdown and subsidence	Prevent ingress and subsidence, rehabilitate rivers and	No undermining of watercourses, including floodplains unless authorised and no high extraction or stooping beneath any delineated wetland.	RQO	Throughout Operational Phase	No loss of surface water to ground water				
	Shondoni Shaft Complex	Aquatic Ecosystems		wetlands and improve flows and water quality in	Compile a rehabilitation plan for the Waterval River and its tributaries to address mining impacts associated with Shondoni Colliery activities.	WUL, RQO, Best Practice Guidelines	At the commencement of operational Phase	Rehabilitate Sasol mining impacts on wetlands and watercourses				



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
				receiving watercourses	Implement a wetland management plan to address mining impacts associated with Shondoni Colliery activities.	WUL, RQO, Best Practice Guidelines	Within the first two years of operation	according to water quality and flow objectives for the Waterval River			
Underground Mining				Prevent ingress and subsidence,	Identify subsidence risk areas and avoid undermining high risk areas.	RQO, NEMBA	Throughout Operational Phase	No loss of surface water to groundwater from wetlands and watercourses			
	Shondoni Shaft Complex	Aquatic Ecosystems	Reduced flows and decrease in water quality due to loss of surface water to groundwater (ingress), drawdown and subsidence	rehabilitate rivers and wetlands and improve flows and water quality in receiving watercourses	Treat surplus mine water on surface to an acceptable standard to be released back into the environment, thus replacing water lost due to ingress/drawdown.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Restore flows (and thereby also improve water quality) in the receiving Waterval River which has been affected by drawdown and ingress as a result of Sasol mining activities. Replace water in watercourses that has been lost to groundwater as a result of Sasol mining activities.			
					Initiate partnerships with municipalities to address sewage- related water quality issues in the Waterval River. Compile an implementation plan and ensure that targets are met.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Improve water quality in the receiving Waterval River.			
					Conduct biomonitoring and water quality monitoring of Waterval River and its tributaries according to a biomonitoring plan and a surface water and groundwater monitoring plan.	WUL, RQO	Operational, Decommissioning and Post Closure	Detect potential impacts to biodiversity timeously and implement appropriate			



	OPERATIONAL PHASE - AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					PES categories below C as a result of Sasol mining activities should trigger management intervention.			management actions; ensure compliance with WUL and RQO				
Underground S Mining			Reduced flows and decrease in water quality due to loss	Prevent ingress and subsidence, rehabilitate rivers and wetlands and improve flows	Monitor flows in the Waterval River and Grootspruit using a v-notch gauging weir (or similar installation) that does not hinder migration by fish.	RQO	Operational, Decommissioning and Post Closure	Detect potential impacts to biodiversity timeously and implement appropriate management actions; ensure compliance with WUL and RQO				
	Shondoni Shaft Complex	Aquatic Ecosystems	of surface water to groundwater (ingress), drawdown and subsidence	and water quality in receiving watercourses	Leaks, spills and seepage from PCDs and pipelines carrying mine water must be prevented through monitoring and maintenance (see mitigation for PCD and pipelines).	RQO, WUL, Best Practice Guidelines	Throughout Operational Phase	No contamination of surface water by mine water				
					Possible decant points after closure should be identified at the commencement of the project and provision should be made for a comprehensive long-term plan to manage mine water during the operational phase and well beyond closure.	RQO, WUL, NEMBA	Operational, Decommissioning and Post Closure	No contamination of surface water by mine water				
					A biodiversity management plan should be compiled and implemented. This should include targets for aquatic ecosystems through flow and water quality management.	RQO, WUL, Best Practice Guidelines	Operational, Decommissioning and Post Closure	No loss of species, achieve ecostatus targets for aquatic biota				
Topsoil/ Overburden Stockpile	Shondoni Shaft Complex	Aquatic Ecosystems	Increased turbidity and sedimentation due to eroded sediments being carried into	Prevent erosion of stockpiles and ensure sediments are intercepted	Stormwater berms and soil stockpiles must be located outside of wetland boundaries.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion or deposition of sediments in receiving wetlands and watercourses				



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
			receiving watercourses in stormwater runoff.	before reaching wetlands or watercourses.	All surface runoff should be directed to a sediment trap. Sediment traps should be regularly inspected and cleaned to ensure optimal functionality.	WUL, Best Practice Guidelines	Throughout Operational Phase	No erosion or deposition of sediments in receiving wetlands and watercourses				
Topsoil/ Overburden Stockpile	Shondoni Shaft Complex	Aquatic Ecosystems	Reduced diversity due to colonisation by reeds.	of stockpiles and ensure sediments are intercepted before reaching	Stockpiles must be re-vegetated to prevent erosion.	Best Practice Guidelines	Throughout Operational Phase	No erosion or deposition of sediments in receiving wetlands and watercourses				
				wetlands or watercourses.	Berms and stockpiles should be stable and sloped appropriately to avoid collapse. Ideally slopes should be less than 2%. Slopes >2% should be vegetated and stabilized.	Best Practice Guidelines	Throughout Operational Phase	No erosion or deposition of sediments in receiving wetlands and watercourses				
					Alien vegetation must be managed according to an alien vegetation management plan.	Biodiversity Action Plan	Throughout Operational Phase	No loss of biodiversity due to invasion by invasive alien species				
				December 11-	The coal storage bunker must be appropriately lined and should drain into the dirty water system. Ponding of water should be prevented.	Best Practice Guidelines, WUL	Throughout Operational Phase					
Coal Storage in S Surface Bunker (Shondoni Shaft Complex	Aquatic Ecosystems	Water quality impacts due to spills of coal fines	Ensure appropriately lined. Channel stormwater	Where acid mine drainage is anticipated or detected, an Acid-Base Accounting Technique and Evaluation (ABATE) should be initiated.	Best Practice Guidelines	Throughout Operational Phase	No acidification or salinisation of receiving watercourses and				
	complex		and dust	water system. Implement dust	The liner must be regularly inspected and its integrity maintained.	Best Practice Guidelines	Throughout Operational Phase	groundwater due to coal storage				
				suppression	Clean and dirty water must be separated.	Best Practice Guidelines, WUL	Throughout Operational Phase	No acidification or salinisation of receiving watercourses and groundwater due to coal storage				
					Leaks of dirty water must be prevented and remedied immediately upon detection.	Best Practice Guidelines, WUL	Throughout Operational Phase					



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
					Conduct biomonitoring and water quality monitoring of Waterval River and its tributaries according to a biomonitoring Plan and a surface water and groundwater monitoring plan.	WUL, RQO	Throughout Operational Phase	Detect potential impacts to biodiversity timeously and implement appropriate management actions; ensure compliance with WUL and RQO			
					The coal storage bunker must be appropriately lined and should drain into the dirty water system. Ponding of water should be prevented.	Best Practice Guidelines, WUL	Throughout Operational Phase				
					Where acid mine drainage is anticipated or detected, an Acid-Base Accounting Technique and Evaluation (ABATE) should be initiated.	Best Practice Guidelines	Throughout Operational Phase	No acidification or salinisation of			
					The liner must be regularly inspected and its integrity maintained.	Best Practice Guidelines	Throughout Operational Phase	receiving watercourses and groundwater due to			
Coal Stockpile and Throw-	Shondoni Shaft Complex	Aquatic Ecosystems	Water quality impacts due to spills of coal fines and dust and	Channel stormwater runoff into dirty	Clean and dirty water must be separated.	Best Practice Guidelines, WUL	Throughout Operational Phase	coal storage			
OutArea	Complex		seepage into groundwater	water system.	Leaks of dirty water must be prevented and remedied immediately upon detection.	Best Practice Guidelines, WUL	Throughout Operational Phase				
					Conduct biomonitoring and water quality monitoring of Waterval River and its tributaries according to a biomonitoring Plan and a surface water and groundwater monitoring plan.	WUL, RQO	Throughout Operational Phase	Detect potential impacts to biodiversity timeously and implement appropriate management actions; ensure compliance with WUL and RQO			



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
			Increased turbidity and sedimentation due to eroded	Prevent erosion	The dump and associated stormwater berms must be located outside of wetland boundaries .	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	N				
Stonedust Dump Shondoni Shaft Complex	Shondoni Shaft Complex	Aquatic Ecosystems	carried into receiving watercourses in stormwater runoff.	sediments are intercepted before reaching wetlands or	All surface runoff should be directed to a sediment trap. Sediment traps should be regularly inspected and cleaned to ensure optimal functionality.	WUL, Best Practice Guidelines	Throughout Operational Phase	No erosion or deposition of sediments in receiving wetlands and watercourses				
			due to colonisation by reeds.	watercourses.	Stormwater runoff must be attenuated to reduce erosion.	WUL, Best Practice Guidelines	Throughout Operational Phase	1				
					The PCD must be effectively lined. Linings should be inspected regularly and the integrity of the lining maintained.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	No seepage of mine water into				
				Prevent spills	The leak detection system must be maintained to work effectively. Damage to the lining must be repaired immediately	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	watercourses via subsurface flows				
			Contamination of	and seepage. Ensure lining is maintained, leaks	The PCD must not be filled above the recommended capacity and must take into account 1:50 storm events.	WUL, Best Practice Guidelines	Throughout Operational Phase					
Shondoni PCD	Shondoni Shaft	Aquatic	water quality in receiving watercourses due	are detected and the required freeboard is	Compile an emergency preparedness plan to cater for potential large-scale spills.	Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses				
	Complex	Ecosystems	to spills, leeks and seepage (or structural failure)	Ensure emergency	Clean and dirty water must be effectively separated so that only dirty water is channelled to the PCD.	Best Practice Guidelines	Throughout Operational Phase					
				Ensure dam safety to prevent structural failure.	Toxicity testing must be conducted quarterly to determine the risk to receiving watercourses.	WUL	Throughout Operational Phase	No loss of biota due to accidental spills, leaks or seepage				
					Biomonitoring and toxicity testing in the receiving watercourse.	WUL	Throughout Operational Phase	Detect impacts and risks to aquatic biota and implement management recommendations; comply with WUL				



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
					Conduct dam safety inspections to detect/prevent structural failure.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	Dam safety ensured			
					The PCD must be effectively lined. Linings should be inspected regularly and the integrity of the lining maintained.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	No seepage of mine water into groundwater or watercourses via subsurface flows			
					The leak detection system must be maintained to work effectively. Damage to the lining must be repaired immediately.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	No seepage of mine water into groundwater or watercourses via subsurface flows			
				Prevent spills and seepage.	The PCD was not be filled above the recommended capacity and must take into account 1:50 storm events.	WUL, Best Practice Guidelines	Throughout Operational Phase				
			Contamination of water quality in	maintained, leaks are detected and the required	Compile an emergency preparedness plan to cater for potential large-scale spills.	Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses			
Shondoni Incline PCD	Shondoni Shaft Complex	Aquatic Ecosystems	receiving watercourses due to spills, leeks and	freeboard is maintained. Ensure	Clean and dirty water must be effectively separated so that only dirty water is channelled to the PCD.	Best Practice Guidelines	Throughout Operational Phase				
			seepage (or structural failure)	emergency preparedness. Ensure dam	Toxicity testing must be conducted quarterly to determine the risk to receiving watercourses.	WUL	Throughout Operational Phase	No loss of biota due to accidental spills, leaks or seepage			
				safety to prevent structural failure.	Biomonitoring and toxicity testing in the receiving watercourse.	WUL	Throughout Operational Phase	Dam safety ensured No seepage of mine water into groundwater or watercourses via subsurface flows No seepage of mine water into groundwater or watercourses via subsurface flows No contamination of watercourses No loss of biota due to accidental spills, leaks or seepage Detect impacts and risks to aquatic biota and implement management recommendations; comply with WUL			
					Conduct dam safety inspections to detect/prevent structural failure.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	Dam safety ensured			



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
					Ensure leaks are detected timeously and repaired immediately.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses			
				Prevent spills and seepage. Ensure lining is	The PCD was not be filled above the recommended capacity and must take into account 1:50 storm events.	WUL, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses			
Surface	Shondoni		Contamination of water quality in receiving	maintained, leaks are detected and the required	Compile an emergency preparedness plan to cater for potential large-scale spills.	Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses			
Service Water Reservoir	Shaft Complex	Aquatic Ecosystems	watercourses due to spills, leeks and seepage (or structural failure)	freeboard is maintained. Ensure emergency preparedness. Ensure dam	Biomonitoring and water quality monitoring in the receiving watercourse.	WUL	Throughout Operational Phase	Detect impacts to biodiversity and implement management recommendations; comply with WUL			
				safety to prevent structural failure.	Conduct dam safety inspections to detect/prevent potential structural weaknesses.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	No structural failures			
					Pipelines carrying mine water must be regularly (weekly) monitored for leaks, which must be immediately repaired.	RQO, Best Practice guidelines	Throughout Operational Phase	No contamination of watercourses from mine water			
Service Water Reticulation System (Pipelines)	Shondoni Shaft	Aquatic	Contamination of water quality in receiving	Prevent spills and leeks. Ensure	An emergency preparedness plan should be compiled that will include measures to contain and remediate any potential spills of mine water, together with post-remediation follow up and monitoring.	RQO, Best Practice guidelines	Throughout Operational Phase	No contamination of watercourses from mine water			
	Complex	Ecosystems	watercourses due to spills and leeks	preparedness.	Pipelines and pollution control facilities carrying or storing dirty water should be located well outside of wetland areas to minimise the potential for contamination of surface water in the event of a spill.	RQO, Best Practice guidelines, WUL	Throughout Operational Phase	No contamination of watercourses from mine water			
					Pipelines must be well maintained to prevent leaks.	RQO, Best Practice guidelines, WUL	Throughout Operational Phase	No contamination of watercourses from mine water			



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					Stormwater berms and soil stockpiles must be located outside of wetland boundaries.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase					
Storm Water Sho Berms and S Canals Cor			Increased turbidity and sedimentation due to eroded	Minimise erosion of berms and	All surface runoff should be directed to a sediment trap. Sediment traps should be regularly inspected and cleaned to ensure optimal functionality.	WUL, Best Practice Guidelines	Throughout Operational Phase	No erosion or deposition of				
	Shondoni Shaft Complex	Aquatic Ecosystems	sediments being carried into receiving watercourses in	stockpiles and ensure sediments are intercepted	Berms must be re-vegetated to prevent erosion.	Best Practice Guidelines	Throughout Operational Phase	receiving wetlands and watercourses				
			stormwater runoff. Reduced diversity due to colonisation by reeds.	before reaching wetlands or watercourses.	Berms and stockpiles should be stable and sloped appropriately to avoid collapse. Ideally slopes should be less than 2%. Slopes >2% should be vegetated and stabilized.	Best Practice Guidelines	Throughout Operational Phase					
					Alien vegetation must be managed according to an alien vegetation management plan.	Biodiversity Action Plan	Throughout Operational Phase	No loss of biodiversity due to invasion by invasive alien species				
Attenuation Dam/ Structure	Shondoni Shaft Complex	Aquatic Ecosystems	Erosion at outlet or in the event of structural failure, impacts to water quality due to stormwater runoff	Ensure structural integrity of structure and monitor and manage erosion at outlet	Monitor for erosion at outlet. Where erosion is taking place, the attenuation structure must be repaired to function optimally and erosion nick points must be managed.	WUL, Best Practice Guidelines	Throughout Operational Phase	No erosion at outlet				
Oil and Silt Traps	Shondoni Shaft	Aquatic	Water quality impacts due to spills and leaks and contamination via stormwater runoff.	Monitor and manage traps to ensure optimal efficacy. Prevent spills and leaks	Silt traps and oil separators should be regularly inspected and any faults immediately remedied.	Best Practice Guidelines	Throughout Operational Phase	No contamination of surface water in receiving watercourses or groundwater				
	Complex	Aquatic Ecosystems		by keeping hazardous substances and waste in bunded areas.	Separate clean and dirty water and ensure dirty water is channelled into the dirty water system.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of surface water in receiving watercourses or groundwater				



	OPERATIONAL PHASE - AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				Dispose of hazardous waste appropriately.	Dispose of hazardous waste (e.g. oils, greases) appropriately.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	No contamination of surface water in receiving watercourses or groundwater				
					Effluent ponds must be appropriately lined. Linings should be inspected regularly and the integrity of the lining maintained.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	No seepage of sewage water into groundwater or watercourses via subsurface flows				
					The WWTW must be well maintained to prevent malfunctions.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	No seepage of sewage water into groundwater or watercourses via subsurface flows				
					The storage and treatment of effluent must not exceed capacity.	WUL, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses				
			Impacts to water	Prevent or minimise discharges into	Treated effluent released into the Grootspruit should meet the WUL requirements.	Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses				
Sewage Treatment Plant	Shondoni Shaft Complex	Ecosystems	quality and loss of aquatic biota in receiving watercourses	the tributary of the Grootspruit. Ensure optimal functioning and	Compile an emergency preparedness plan to cater for potential large-scale spills.	Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses				
			watercourses	maintenance of WWTW.	Clean and dirty water must be effectively separated.	Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses				
					Toxicity testing must be conducted in the final effluent pond as well as in the receiving Grootspruit.	WUL	Throughout Operational Phase	No risk of toxicity to aquatic biota. Toxicity hazard of Class III or higher must trigger management action.				
					Biomonitoring and toxicity testing in the receiving watercourse.	WUL	Throughout Operational Phase	Detect impacts and risks to biodiversity and implement management recommendations; comply with WUL				



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Iso Yard (Temporary storage of general, domestic and industrial waste)	Shondoni Shaft Complex	Aquatic Ecosystems	Contamination of watercourses through seepage and runoff	Manage runoff. Dispose of waste appropriately and timeously	Appropriate disposal of solid waste and hazardous waste, based on classification.	BPEO, NEMWA	Throughout Operational Phase	No contamination of surface water in receiving watercourses or groundwater				
Iso Yard				Manage spills and runoff.	Appropriate disposal of solid waste and hazardous waste, based on classification.	BPEO, NEMWA	Throughout Operational Phase	No contamination of				
(Temporary storage of	Shondoni Shaft Complex	Aquatic Ecosystems	Contamination of watercourses through seepage	Dispose of waste appropriately and timeously.	Store hazardous waste in bunded areas to prevent leaks, spills, seepage.	BPEO, NEMWA	Throughout Operational Phase	surface water in receiving				
waste)	complex	and runoff	Hazardous waste must be stored in bunded areas.	Separate clean and dirty stormwater and channel dirty water into the dirty water system.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	groundwater					
Capital Yard (Temporary storage of scrap metal)	Shondoni Shaft Complex	Aquatic Ecosystems	Contamination of watercourses through seepage and runoff	Manage runoff. Dispose of waste appropriately and timeously	Appropriate disposal of solid waste and hazardous waste, based on classification.	BPEO, NEMWA	Throughout Operational Phase	No contamination of surface water in receiving watercourses or groundwater				
				SIMUNY	E SHAFT COMPLEX							
			Increased turbidity and sedimentation due to eroded sediments and	Manage stormwater runoff, prevent erosion at	Stormwater should discharge into grassed verges and not into wetlands or watercourses.	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	No erosion or discharge of stormwater into wetlands or watercourses				
Access Roads	Simunye Shaft Complex	Aquatic Ecosystems	contaminants being carried into receiving watercourses in	stormwater outlets and prevent stormwater from	Effective separation of clean and dirty water.	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	Dirty water separated from clean water				
			watercourses in stormwater runoff.	discharging directly into wetland areas.	Erosion protection and energy dissipaters at culverts where necessary.	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	No erosion visible downslope of development footprint				



	OPERATIONAL PHASE - AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
			Increased turbidity and sedimentation	Manage stormwater runoff, prevent	Spills and leaks (e.g. fuel, grease and oils) should be remediated. All vehicles must be regularly inspected for leaks.	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	No contamination of natural watercourses			
Access Roads	Simunye Shaft Complex	Aquatic Ecosystems	due to eroded sediments and contaminants being carried into	erosion at stormwater outlets and prevent	Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	Ensure compliance with WUL and RQO			
			watercourses in stormwater runoff	stormwater from discharging directly into wetland areas.	Roads crossings of wetlands should be regularly inspected for debris that may create blockages and constricted flows	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	No erosion at culverts			
					Spills and leaks should be prevented and managed.	WUL, WQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses due to leaks or spills			
				Prevent spills and leaks by storing	An emergency preparedness plan must be compiled that will include measures to contain and remediate any potential spill, together with post- remediation follow up and monitoring. All staff should be trained to act appropriately in the event of a spill.	WUL, WQO, Best Practice Guidelines	Throughout Operational Phase	Immediate and effective response to major incidents			
Offices, Workshops and Changabausag	Simunye Shaft Complex	Aquatic Ecosystems	Water quality impacts due to spills and leaks and contamination via	hazardous waste, oils and fuels in bunded areas. Dispose of	Implement all recommendations for effective separation of clean and dirty water and attenuated release of clean storm water.	WUL, WQO, Best Practice Guidelines	Throughout Operational Phase	Clean water separated from dirty water			
and Changehouses			stormwater runoff.	appropriately. Ensure oil and silt traps are maintained and	All machinery should be well maintained to prevent leaks. Silt traps and oil separators should be regularly inspected and any faults immediately addressed.	WUL, WQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses due to leaks or spills			
				optimally.	Hazardous substances and hazardous waste must be appropriately stored in bunded areas.	NEMWA, BPEO	Throughout Operational Phase	No contamination of watercourses due to leaks or spills			
					Dispose of hazardous waste and solid waste appropriately.	NEMWA, BPEO	Throughout Operational Phase	All waste removed from site and disposed of at correct facility.			



OPERATIONAL PHASE - AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
					Stormwater should discharge into grassed verges and not into wetlands or watercourses.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion or discharge of stormwater into wetlands or watercourses			
Internal Roads and Parking Areas			Increased turbidity	Manage stormwater	Effective separation of clean and dirty water.	WUL, RQO, Best Practice Guidelines	Throughout Operational and Decommissioning Phases	Dirty water separated from clean water			
	Simunye Shaft Complex	Aquatic ecosystems	and sedimentation due to eroded sediments being carried into	prevent erosion at stormwater outlets and prevent	Erosion protection and energy dissipaters at culverts where necessary.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion visible downslope of development footprint			
			receiving watercourses in stormwater runoff.	stormwater from discharging directly into wetland areas.	Spills and leaks (e.g. fuel, grease and oils) should be remediated. All vehicles must be regularly inspected for leaks.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of natural watercourses			
					Roads crossings of wetlands should be regularly inspected for debris that may create blockages and constricted flows.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	Standard to be achievedNo erosion or discharge of stormwater into wetlands or watercoursesDirty water separated from clean waterNo erosion visible downslope of development footprintNo contamination of natural watercoursesNo erosion at culvertsRehabilitate Sasol mining impacts on watercourses according to water quality and flow objectives for the Waterval RiverNo loss of surface water to groundwater from wetlands and watercourses			
			Reduced flows and	Prevent ingress and subsidence,	Compile a rehabilitation plan for the Waterval River and its tributaries to address mining impacts associated with Shondoni Colliery activities.	WUL, RQO, Best Practice Guidelines	At the commencement of operational Phase	Rehabilitate Sasol mining impacts on wetlands and watercourses			
Underground Mining	Simunye Shaft Complex	Aquatic Ecosystems	quality due to loss of surface water to groundwater, dewatering and subsidence	rivers and wetlands and improve flows and water quality in	Implement a wetland management plan to address mining impacts associated with Shondoni Colliery activities.	WUL, RQO, Best Practice Guidelines	Within the first two years of operation	according to water quality and flow objectives for the Waterval River			
				receiving watercourses	Identify subsidence risk areas and avoid undermining high risk areas.	RQO, NEMBA	Throughout Operational Phase	No erosion or discharge of stormwater into wetlands or watercourses Dirty water separated from clean water No erosion visible downslope of development footprint No contamination of natural watercourses No erosion at culverts Rehabilitate Sasol mining impacts on wetlands and watercourses according to water quality and flow objectives for the Waterval River No loss of surface water to groundwater from wetlands and watercourses			



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS													
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved						
Underground				Prevent ingress and subsidence,	Treat surplus mine water on surface to an acceptable standard to be released back into the environment, thus replacing water lost due to ingress/drawdown.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Restore flows (and thereby also improve water quality) in the receiving Waterval River which has been affected by drawdown and ingress as a result of Sasol mining activities. Replace water in watercourses that has been lost to groundwater as a result of Sasol mining activities.						
	Simunye Shaft Complex	Aquatic Ecosystems	Reduced flows and decrease in water quality due to loss of surface water to	rehabilitate rivers and wetlands and improve flows and water	Initiate partnerships with municipalities to address water quality issues in the Waterval River; compile an implementation plan with auditable targets.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Improve water quality in the receiving Waterval River						
			groundwater, dewatering and subsidence	quality in receiving watercourses	quality in receiving watercourses	receiving watercourses	receiving watercourses	receiving watercourses	receiving watercourses	receiving watercourses	Conduct biomonitoring and water quality monitoring of Waterval River and its tributaries according to a biomonitoring plan and a surface water and groundwater monitoring plan.	WUL, RQO	Operational, Decommissioning and Post Closure	Standard to be achievedRestore flows (and thereby also improve water quality) in the receiving Waterval River which has been affected by drawdown and ingress as a result of Sasol mining activities. Replace water in watercourses that has been lost to groundwater as a result of Sasol mining activities.Improve water quality in the receiving Waterval RiverDetect potential impacts to biodiversity timeously and implement appropriate management actions Ensure compliance with WUL and RQONo contamination of surface water by mine waterNo contamination of surface water by mine water
					Monitor flows in the Waterval River and Grootspruit using a v-notch gauging weir (or similar installation) that does not hinder fish migration.	RQO	Operational, Decommissioning and Post Closure	management actions Ensure compliance with WUL and RQO						
					Leaks, spills and seepage from PCDs and pipelines carrying mine water must be prevented through monitoring and maintenance (see mitigation for PCD and pipelines).	RQO, WUL, Best Practice Guidelines	Throughout Operational Phase	No contamination of surface water by mine water						
					Possible decant points after closure should be identified at the commencement of the project and	RQO, WUL, NEMBA	Operational, Decommissioning and Post Closure	No contamination of surface water by mine water						



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Underground Mining	Simunye Shaft Complex	Aquatic Ecosystems	Reduced flows and decrease in water quality due to loss of surface water to groundwater,	Prevent ingress and subsidence, rehabilitate rivers and wetlands and	provision should be made for a comprehensive long-term plan to manage mine water during the operational phase and well beyond closure.							
			dewatering and subsidence	improve flows and water quality in receiving watercourses	A biodiversity management plan should be compiled and implemented. This should include targets for aquatic ecosystems through flow and water quality management.	RQO, WUL, Best Practice Guidelines	Operational, Decommissioning and Post Closure	No loss of species, achieve ecostatus targets for aquatic biota				
					Stormwater berms and soil stockpiles must be located outside of wetland boundaries.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase					
			Increased turbidity and sedimentation	Prevent erosion of berms and ensure sediments are intercepted	All surface runoff should be directed to a sediment trap. Sediment traps should be regularly inspected and cleaned to ensure optimal functionality.	WUL, Best Practice Guidelines	Throughout Operational Phase	No erosion or deposition of				
Topsoil/ Overburden Stockpile	Simunye Shaft Complex	Aquatic Ecosystems	due to eroded sediments being carried into receiving wetlands and watercourses	before reaching wetlands or watercourses. Prevent erosion of berms and ensure	Stockpiles must be re-vegetated to prevent erosion.	Best Practice Guidelines	Throughout Operational Phase	receiving wetlands and watercourses				
			in stormwater runoff. Reduced diversity due to colonisation by reeds.	ensure sediments are intercepted before reaching wetlands or watercourses	Berms and stockpiles should be stable and sloped appropriately to avoid collapse. Ideally slopes should be less than 2%. Slopes >2% should be vegetated and stabilized.	Best Practice Guidelines	Throughout Operational Phase					
					Alien vegetation must be managed according to an alien vegetation management plan.	Biodiversity Action Plan	Throughout Operational Phase	No loss of biodiversity due to invasion by invasive alien species				
Stonedust Dump	Simunye Shaft Complex	Aquatic Ecosystems	Increased turbidity and sedimentation due to eroded	Prevent erosion of stockpiles and ensure	The dump and associated stormwater berms must be located outside of wetland boundaries.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion or deposition of sediments in				



OPERATIONAL PHASE - AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
			sediments being carried into receiving watercourses in stormwater runoff.	sediments are intercepted before reaching wetlands or watercourses.	All surface runoff should be directed to a sediment trap. Sediment traps should be regularly inspected and cleaned to ensure optimal functionality.	WUL, Best Practice Guidelines	Throughout Operational Phase	receiving wetlands and watercourses			
			Reduced diversity due to colonisation by reeds.		Stormwater runoff must be attenuated to reduce erosion.	WUL, Best Practice Guidelines	Throughout Operational Phase				
				The PCD must be effectively lined. Linings should be inspected regularly and the integrity of the lining maintained.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	No seepage of mine water into				
					A leak detection system must be maintained to work effectively. Damage to the lining must be repaired immediately.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	watercourses via subsurface flows			
				Prevent spills	The PCD was not be filled above the recommended capacity and must take into account 1:50 storm events.	WUL, Best Practice Guidelines	Throughout Operational Phase	No contamination of			
Service Water	Cimunuo		Contamination of water quality in receiving	Ensure lining is maintained, leaks	Compile an emergency preparedness plan to cater for potential large-scale spills.	Best Practice Guidelines	Throughout Operational Phase	watercourses			
Service Water Dam (Bottom)	Shaft Complex	Aquatic Ecosystems	watercourses due to spills, leeks and seepage (or	the required freeboard is	Clean and dirty water must be effectively separated so that only dirty water is channelled to the PCD.	Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses			
			structural failure)	Ensure emergency preparedness	Toxicity testing must be conducted quarterly to determine the risk to receiving watercourses.	WUL	Throughout Operational Phase	No loss of biota due to accidental spills, leaks or seepage			
				preparedness. Ensure dam safety to prevent structural failure.	Biomonitoring and toxicity testing in the receiving watercourse.	WUL	Throughout Operational Phase	Detect impacts and risks to biodiversity and implement management recommendations; comply with WUL			
					Conduct dam safety inspections to detect/prevent structural failure.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	Dam safety ensured.			
Service Water Reticulation System (Pipelines)	Simunye Shaft Complex	Aquatic Ecosystems	Contamination of water quality in receiving	Prevent spills and seepage. Ensure lining is maintained, leaks	Pipelines carrying mine water must be regularly (weekly) monitored for leaks, which must be immediately repaired.	RQO, Best Practice guidelines	Throughout Operational Phase	No contamination of watercourses from mine water			



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS													
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved						
	watercourses to spills and le	watercourses due to spills and leeks	are detected and the required freeboard is maintained. Ensure emergency preparedness.	An emergency preparedness plan should be compiled that will include measures to contain and remediate any potential spills of mine water, together with post-remediation follow up and monitoring.	RQO, Best Practice guidelines	Throughout Operational Phase	No contamination of watercourses from mine water							
				Ensure dam safety to prevent structural failure.	safety to prevent structural failure.	safety to prevent structural failure.	safety to prevent structural failure.	safety to prevent structural failure.	safety to prevent structural failure.	safety to prevent structural failure.	Pipelines and pollution control facilities carrying or storing dirty water should be located well outside of wetland areas to minimise the potential for contamination of surface water in the event of a spill.	RQO, Best Practice guidelines, WUL	Throughout Operational Phase	No contamination of watercourses from mine water
					Pipelines must be well maintained to prevent leaks.	RQO, Best Practice guidelines, WUL	Throughout Operational Phase	No contamination of watercourses from mine water						
					Stormwater berms and soil stockpiles must be located outside of wetland boundaries.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion or deposition of sediments in receiving wetlands and watercourses						
Storm Water	Simunve		Increased turbidity and sedimentation due to eroded sediments being carried into	Prevent erosion of berms and ensure	All surface runoff should be directed to a sediment trap. Sediment traps should be regularly inspected and cleaned to ensure optimal functionality.	WUL, Best Practice Guidelines	Throughout Operational Phase	No erosion or deposition of sediments in receiving wetlands and watercourses						
Berms and Canals	Shaft Complex	Aquatic Ecosystems	and watercourses	intercepted	Berms must be re-vegetated to prevent erosion.	Best Practice Guidelines	Throughout Operational Phase	No erosion or						
Canals		Ecosystems	in stormwater runoff. Reduced diversity due to colonisation by reeds.	wetlands or watercourses.	Berms and stockpiles should be stable and sloped appropriately to avoid collapse. Ideally slopes should be less than 2%. Slopes >2% should be vegetated and stabilized.	Best Practice Guidelines	Throughout Operational Phase	deposition of sediments in receiving wetlands and watercourses						
					Alien vegetation must be managed according to an alien vegetation management plan.	Biodiversity Action Plan	Throughout Operational Phase	No loss of biodiversity due to invasion by invasive alien species						



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					Effluent ponds must be appropriately lined. Linings should be inspected regularly and the integrity of the lining maintained.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	No seepage of sewage water into groundwater or watercourses via				
					The WWTW must be well maintained to prevent malfunctions.	NEMWA, BPEO, Best Practice Guidelines	Throughout Operational Phase	subsurface flows				
					The storage and treatment of effluent must not exceed capacity.	WUL, Best Practice Guidelines	Throughout Operational Phase					
			Impacts to water	Prevent spills, leaks and seepage from the	Treated effluent released into the Grootspruit should meet the WUL requirements.	Best Practice Guidelines	Throughout Operational Phase					
Sewage Treatment Plant	Simunye Shaft Complex	Aquatic Ecosystems	quality and loss of aquatic biota in receiving watercourses	WWTW as well as the service water dams. Ensure optimal functioning and	Compile an emergency preparedness plan to cater for potential large-scale spills.	Best Practice Guidelines	Throughout Operational Phase	No contamination of watercourses				
				maintenance of WWTW.	Clean and dirty water must be effectively separated.	Best Practice Guidelines	Throughout Operational Phase					
					Toxicity testing must be conducted in the final effluent pond as well as in the receiving Grootspruit.	WUL	Throughout Operational Phase	No risk of toxicity to aquatic biota. Toxicity hazard of Class III or higher must trigger management action.				
					Biomonitoring and toxicity testing in the receiving watercourse.	WUL	Throughout Operational Phase	Detect impacts and risks to biodiversity and implement management recommendations; comply with WUL				
Storage Yard (Temporary storage of	Simunye Shaft Complex	Aquatic Ecosystems	Contamination of watercourses	Manage runoff. Dispose of waste	Appropriate disposal of solid waste and hazardous waste, based on classification.	BPEO, NEMWA	Throughout Operational Phase	No contamination of surface water in receiving				



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
general, domestic and industrial waste)			through seepage and runoff	appropriately and timeously	Stormwater runoff to be directed to dirty water system.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	watercourses or groundwater				
Storage Yard		Contamination of	Manage spills and runoff. Dispose of waste	Appropriate disposal of solid waste and hazardous waste, based on classification.	BPEO, NEMWA	Throughout Operational Phase	No contamination of					
storage of hazardous waste)	Shaft Complex	Aquatic Ecosystems	watercourses through seepage and runoff	appropriately and timeously. Hazardous waste	Store hazardous waste in bunded areas to prevent leaks, spills, seepage.	BPEO, NEMWA	Throughout Operational Phase	receiving watercourses or groundwater				
Wastej					Separate clean and dirty stormwater and channel dirty water into the dirty water system.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	-				
				PROP	OSED ACTIVITIES							
Underground	Shondoni Colliery -		Decreased flows, habitats, water quality and	Prevent ingress and subsidence, rehabilitate rivers and wetlands and	Compile a rehabilitation plan for the Waterval River and its tributaries to address mining impacts associated with Shondoni Colliery activities.	WUL, RQO, Best Practice Guidelines	At the commencement of operational Phase	Rehabilitate Sasol mining impacts on wetlands and watercourses according to water quality and flow objectives for the Waterval River				
Mining (New Block 8 North)	New Block 8 North Reserve	Aquatic Ecosystems	biodiversity due to loss of surface water to groundwater	improve flows and water quality in receiving	Implement a wetland management plan to address mining impacts associated with Shondoni Colliery activities.	WUL, RQO, Best Practice Guidelines	Within the first two years of operation					
			groundwater	watercourses	No undermining of watercourses, including floodplains unless authorised and no high extraction or stooping beneath any delineated wetland.	RQO	Throughout Operational Phase	water to ground water				
					Identify subsidence risk areas and avoid undermining high risk areas.	RQO, NEMBA	Throughout Operational Phase	No loss of surface water to groundwater from wetlands and watercourses				



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North	Aquatic Ecosystems	Decreased flows, habitats, water quality and biodiversity due to loss of surface water to	Prevent ingress and subsidence, rehabilitate rivers and wetlands and improve flows and water	Treat surplus mine water to an acceptable standard to be released back into the environment, thus replacing water lost due to ingress/drawdown.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Restore flows (and thereby also improve water quality) in the receiving Waterval River which has been affected by drawdown and ingress as a result of Sasol mining activities. Replace water in watercourses that has been lost to groundwater as a result of Sasol mining activities.				
	Reserve		groundwater	quality in receiving watercourses	Initiate partnerships with municipalities to address water quality issues in the Waterval River.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Improve water quality in the receiving Waterval River				
					Conduct biomonitoring and toxicity testing in the Waterval River and its tributaries according to a biomonitoring plan and a surface water and groundwater monitoring plan. PES categories below C as a result of Sasol mining activities should trigger management intervention.	WUL, RQO	Operational, Decommissioning and Post Closure	Detect potential impacts to biodiversity timeously and implement appropriate management actions; ensure compliance with WUL and RQO				
					Monitor flows in the Waterval River and Rolspruit using a gauging weir (or similar installation) that does not impact upon fish migration.	RQO	Operational, Decommissioning and Post Closure	No contamination of				
				Possible decant points after closure should be identified at the commencement of the project and provision should be made for a comprehensive long-term plan to	RQO, WUL, NEMBA	Operational, Decommissioning and Post Closure	surtace water by mine water					



	OPERATIONAL PHASE - AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					manage mine water during the operational phase and well beyond closure.							
					A biodiversity management plan should be compiled and implemented. This should include targets for aquatic ecosystems through flow and water quality management.	RQO, WUL, Best Practice Guidelines	Operational, Decommissioning and Post Closure	No loss of species, achieve ecostatus targets for aquatic biota				
			Water quality	Manage erosion at stormwater outlets. Prevent	Attenuate flows at stormwater outlets to prevent erosion.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion at stormwater outlets				
West Upcast	West Upcast Ventilation Shaft Shaft Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	impacts to the Waterval River due to surface runoff	leaks of hazardous substances (e.g.	Direct stormwater away from the shaft entrance.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No loss of surface water to ground water					
West Upcast Ventilation Shaft		Ecosystems	containing contaminants (e.g. grease/oils) and eroded sediment at stormwater outlets	fuels/oils) and ensure sediments and oils are trapped. Before being discharged in stormwater	Separate clean and dirty water.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of receiving watercourses				
			Water quality	Manage erosion at stormwater	Attenuate flows at stormwater outlets to prevent erosion.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion at stormwater outlets				
West	Shondoni Colliery -		impacts to the Waterval River due	leaks of hazardous	outlets. Prevent Guidelines leaks of Direct stormwater away from the hazardous shaft entrance.		Throughout Operational Phase	No loss of surface water to ground water				
Downcast Ventilation Shaft	Farm Brakspruit 359 IR Portion 8	Aquatic Ecosystems	containing contaminants (e.g. grease/oils) and eroded sediment at stormwater outlets	fuels/oils) and ensure sediments and oils are trapped. Before being discharged in stormwater	Separate clean and dirty water	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of receiving watercourses				
North Upcast Vertilation	Shondoni Colliery - Farm	Aquatic	Water quality impacts to the Waterval Tributary	Manage erosion at stormwater outlets. Prevent	Attenuate flows at stormwater outlets to prevent erosion.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion at stormwater outlets				
Shaft	Kromdraai 128 IS Portion 4	Aquatic Ecosystems	due to surface runoff containing contaminants (e.g.	leaks of hazardous substances (e.g.	Direct stormwater away from the shaft entrance.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No loss of surface water to ground water				



	OPERATIONAL PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Potential Impact Affected		Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
			grease/oils), dust and eroded sediment at stormwater outlets	fuels/oils) and ensure sediments and oils are trapped. Before being discharged in stormwater	Separate clean and dirty water.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of receiving watercourses				
			Water quality	Manage erosion at stormwater outlets. Prevent	Attenuate flows at stormwater outlets to prevent erosion.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No erosion at stormwater outlets				
North	Shondoni Colliery - Farm	Shondoni Colliery - Farm Aquatic due to sur	impacts to the Waterval Tributary due to surface	e leaks of ary hazardous e substances (e.g.	Direct stormwater away from the shaft entrance.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No loss of surface water to ground water				
Ventilation Shaft	Kromdraai 128 IS Portion 4	Ecosystems	runoff containing contaminants (e.g. grease/oils) and eroded sediment at stormwater outlets	fuels/oils) and ensure sediments and oils are trapped. Before being discharged in stormwater	Separate clean and dirty water.	WUL, RQO, Best Practice Guidelines	Throughout Operational Phase	No contamination of receiving watercourses				



	OPERATIONAL PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				5	SHONDONI SHAFT COMPLEX							
			Stormwater runoff from		Regularly (at least twice a year) undertake inspections and maintenance of stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Well-functioning stormwater system.				
			wetlands and leading to water	Control and modify. Manage	Regular inspections and cleaning of culverts (at least twice a year). Maintain logbook of inspection events.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No blocked culverts impeding flow.				
Access Roads	Shondoni Shaft	Wetlands	deterioration. Erosion at	stormwater runoff, prevent erosion,	Survey existing stormwater discharge points for erosion damage and implement corrective actions	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No erosion at stormwater discharge points.				
	Complex		discharge points. Culvert	maintain culverts at optimal	Report and address all spills and leaks of contaminants occurring on the access road.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Well-functioning stormwater system. No blocked culverts impeding flow. No erosion at stormwater discharge points. No contamination of downstream wetland. Ensure compliance with WUL and RQOs. Ensure compliance with WUL and RQOs. Well-functioning stormwater system. Well-functioning stormwater system. No erosion at stormwater discharge points. No contamination of downstream wetland. Habitat integrity of				
			leading to	functionality.	Implement wetland monitoring for downstream affected wetland.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Ensure compliance with WUL and RQOs.				
			and/or flow concentration		Implement biomonitoring and water quality monitoring as recommended in specialist reports.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Ensure compliance with WUL and RQOs.				
					Implement stormwater management plan and maintain stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Well-functioning stormwater system.				
Security Fence and Access; Offices,			Stormwater		Regularly (at least twice a year) undertake inspections and maintenance of stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Twice a year throughout project lifetime.	Well-functioning stormwater system.				
Workshops and Changehouses; Internal Roads			runoff from infrastructures entering	Control and	Survey existing stormwater discharge points for erosion damage and implement corrective actions.	WUL, RQO, Best Practice Guidelines	Twice a year throughout project lifetime.	No erosion at stormwater discharge points.				
and Parking Areas; Man and	Shondoni	Wotlands	quality	modify	Separate clean and dirty water areas. No dirty water to be discharged.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Well-functioning stormwater system. No blocked culverts impeding flow. No erosion at stormwater discharge points. No contamination of downstream wetland. Ensure compliance with WUL and RQOS. Ensure compliance with WUL and RQOS. Well-functioning stormwater system. Well-functioning stormwater system. No erosion at stormwater discharge points. No contamination of downstream wetland. Habitat integrity of downstream wetland to b maintained. Habitat integrity of downstream wetland to b maintained. No contamination of downstream wetland to b maintained.				
Material Shaft Infrastructure; Ventilation	Complex	weuanus	Erosion at stormwater	stormwater runoff, prevent	Minimise extent of dirty water isolation areas.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Habitat integrity of downstream wetland to be maintained.				
Ventilation Shaft; Potable Water Reservoir; Attenuation Dam/ Structure;			points. Disturbance of wetland biota in	Limit water quality impacts	Ensure all clean runoff is discharge into the environment. Discharge in an environmentally sustainable manner.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Habitat integrity of downstream wetland to be maintained.				
			wetland biota in adjacent wetland habitat. Littering in		Undertake litter clean up operations in wetland immediately adjacent to Shondoni shaft at least once a year during spring.	WUL, RQO, Best Practice Guidelines	Once a year throughout project lifetime.	No contamination of downstream wetland.				

Table 5.2(k): Operational Phase Impact Management Measures Table – Wetlands



	OPERATIONAL PHASE - WETLANDS																														
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved																							
Storm Water Berms and Canals			adjacent wetland habitat.		Develop a spill response plan to ensure rapid and appropriate response to any spills of potential contaminants.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No contamination of downstream wetland.																							
Fuel & Oil Storage					Separate clean and dirty water areas. No dirty water to be discharged.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.																							
Explosives Off- Load Area		Stormwater runoff from infrastructures entering		Minimise extent of dirty water isolation areas.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.																								
Coal storage in Surface Bunker Coal Stockpile		wetlands and leading to water quality deterioration. Leakage and seepage of contaminants from PCDs and	wetlands and leading to water quality deterioration.	Control and modify.	Ensure all clean runoff is discharge into the environment. Discharge in an environmentally sustainable manner.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.																							
Area Stonedust Dump	Shondoni		Leakage and seepage of contaminants from PCDs and	Successfully	Conduct biomonitoring and water quality monitoring of Waterval River and its tributaries according to a biomonitoring Plan and a surface water and ssfully groundwater monitoring plan. WUL, RQO, Best Practice Guidelines Practice Guidelines	No degradation of habitat or water quality in adjacent wetlands from current state.																									
Shondoni PCD; Shondoni Incline PCD Surface Service	Shaft Complex	Wetlands	areas into adjacent wetlands. Erosion at	isolate dirty water areas.	Ensure PCD is managed within design and specifications and that an appropriate freeboard is maintained. Minimise occurrences of overflow. No overflow for storm with recurrence interval less than 50 years.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.																							
Water Reservoir Capital Yard &			discharge points.	ter ge Zero discharge of dirty water. ce of ota in it bitat. ; in it bitat.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Zero discharge of dirty water.	Compile an emergency preparedness plan to cater for potential large-scale spills.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.
Sewage Treatment Plant		Disturbance of wetland biota in adjacent wetland babitat																										of dirty water.	Conduct regular inspections of all PCD's to ensure full compliance with legislation and design specifications.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.
Oil and Silt Traps			Littering in adjacent wetland habitat.		Develop a rehabilitation response plan should water quality deterioration in the receiving environment be detected.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.																							
Conveyor System	Shondoni Shaft Complex	Wetlands	Stormwater runoff from conveyor	Control and modify.	Regularly (at least twice a year) undertake inspections and maintenance of stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No erosion or sediment fans at stormwater outlets.																							


	OPERATIONAL PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
			servitude entering wetlands. Leads to water		Regular inspections and cleaning of culverts (at least twice a year). Maintain logbook.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No blocked culverts impeding flow.				
Conveyor Sł System C			quality deterioration. Erosion at stormwater	Manage	Survey existing stormwater discharge points for erosion damage and implement corrective actions.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No erosion or sediment fans at stormwater outlets.				
	Shondoni Shaft Compley	Wetlands	discharge points. Culvert blockages	runoff, prevent erosion, maintain	Report and address all significant spills of coal occurring along the conveyor.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No contamination of lownstream wetlands. Ensure compliance with WUL and RQOs. Ensure compliance with				
	Complex		impoundment and/or flow concentration.	optimal functionality.	Implement wetland monitoring for wetlands crossed by conveyor.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.					
			Dust and coal spillage entering wotlands		Implement biomonitoring and water quality monitoring as recommended in relevant specialist reports.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Standard to be achieved No blocked culverts impeding flow. No erosion or sediment fans at stormwater outlets. No contamination of downstream wetlands. Ensure compliance with WUL and RQOs. Ensure compliance with WUL and RQOs. Prevent surface subsidence in wetlands. Prevent surface subsidence in wetlands. Prevent surface subsidence in wetlands.				
			leading to water quality deterioration.		Maintain conveyor gantries to ensure conveyor remains enclosed over wetlands.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Ensure compliance with WUL and RQOs.				
			Decreased flow in wetlands due		Undermining of wetlands as authorised.	WUL, RQO, Best Practice Guidelines	Design Phase and through project lifetime.	Prevent surface subsidence in wetlands.				
Underground Mining	Shondoni Shaft Complex	Wetlands	to groundwater drawdown Altered flow within wetlands due to surface subsidence Decreased flow in wetlands due to surface subsidence	Control and modify - prevent subsidence .	Surface subsidence under wetlands and in close proximity to wetlands must be avoided and a suitable pillar safety factor should be implemented to ensure this. As a minimum, it is recommended that no subsidence or sinkholes be allowed to take place within delineated wetland areas and a 100m buffer. Stability of the overlying strata must be ensured in the long-term, i.e. permanently.	WUL, RQO, Best Practice Guidelines	Design Phase and through project lifetime.	Prevent surface subsidence in wetlands.				
					No high extraction mining to take place under watercourses.	WUL, RQO, Best Practice Guidelines	Design Phase and through project lifetime.	Prevent surface subsidence in wetlands.				



	OPERATIONAL PHASE - WETLANDS																							
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved																
			Water quality deterioration due to decant Habitat degradation.		A detailed subsidence risk assessment based on the latest version of the mine plan should be undertaken to determine the location and surface expression of any subsidence that may occur.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent surface subsidence in wetlands.																
Underground Mining					Where a likely loss of groundwater inputs/baseflow to the wetlands is expected, the relative significance of this loss should be determined and quantified to allow for the evaluation and possible implementation of alternative mitigation measures to address flow losses from groundwater drawdown.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Limit flow reduction in wetlands.																
	Shondoni Shaft Complex	Wetlands	Decreased flow in wetlands due to surface subsidence, water quality deterioration due to decent	Minimise drawdown of groundwater, minimise flow reduction in wetlands	The likelihood of decant, as well as its location and expected quality should be accurately determined at a high level of confidence and measures put in place to ensure that no decant or discharge of contaminated water occurs, unless it meets the applicable resource quality objectives (RQO's).	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Limit flow reduction in wetlands.																
			habitat degradation.	Control and modify - prevent subsidence, minimise drawdown of groundwater, minimise flow reduction in wetlands	Control and modify -	Control and modify -	Control and modify -	Control and modify -	Control and modify -	Control and modify - prevent	Should treatment of surplus mine water be required, the discharge of treated water into the environment should be investigated and implemented.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Limit flow reduction in wetlands.										
					A detailed regional water monitoring strategy should be developed for the Shondoni Colliery. This should consider all aspects related to water (surface water, groundwater, aquatic ecology, wetlands etc.) and should tie in with monitoring strategies of adjacent mines. Such a monitoring strategy must include flow monitoring stations.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Limit flow reduction in wetlands																
					Studies should be commissioned to better understand the long-term consequences of surface subsidence on wetlands, including the development of preferential flow paths into mine workings resulting in loss of surface flow. Persistence of such flow paths over time should also be investigated.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Limit flow reduction in wetlands.																



	OPERATIONAL PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					Manage topsoil stockpile as per recommendations in soil specialist study.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent sediment transport in adjacent wetlands				
Topsoil/ Overburden Stockpile			Mobilisation of sediments off the stockpiles entering	Control and	Install sediment barriers around downslope edge of stockpiles to trap any sediment transported off the stockpiles by runoff.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent sediment transport in adjacent wetlands.				
	Shondoni Shaft Complex	Wetlands	adjacent wetlands – via runoff,	Manage stormwater	Regularly inspect and repair sediment barriers.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent sediment transport in adjacent wetlands.				
			habitat degradation in adjacent wetlands	erosion, limit water quality impacts.	Any stockpiles containing carbonaceous material should be considered dirty water areas and isolated from clean water systems and runoff.	WUL, RQO, Best Practice Guidelines	JL, RQO, Best Throughout Prevent water quality nctice Guidelines Project lifetime. Prevent water quality	Prevent water quality deterioration in adjacent wetlands.				
					Control and manage alien vegetation on stockpiles as per alien vegetation management plan.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent establishment of alien invasive trees.				
					Develop an emergency response plan for any pipeline failure and large leaks.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent wetland degradation due to pipeline leaks / failure.				
					Conduct regular inspections of pipelines for leaks and damage.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent wetland degradation due to pipeline leaks / failure.				
Potable Water Supply System			Pipeline leaks		Install pressure / flow monitoring equipment for automatic detection of leaks / failure.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent wetland degradation due to pipeline leaks / failure.				
(Pipelines) Service Water	Shondoni Shaft Complex	Wetlands	leading to water quality impacts in wetlands.	Control and modify.	Control alien vegetation along pipeline and powerline servitudes.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent wetland degradation due to pipeline leaks / failure.				
Reticulation System (Pipelines) Electricity Supply			Disturbance to wetlands during maintenance	and leaks. Emergency	Make use of existing rods and tracks to access pipelines and powerline for maintenance purposes.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent wetland degradation due to pipeline leaks / failure.				
			maintenance activities	preparedness.	Should maintenance activities require any excavations within wetland areas such work must be undertaken under the guidance of a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent wetland degradation due to pipeline leaks / failure.				



	OPERATIONAL PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
	SIMUNYE SHAFT COMPLEX											
			Stormwater runoff from		Regularly (at least twice a year) undertake inspections and maintenance of stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Well-functioning stormwater system.				
			road entering wetlands and leading to water	Control and	Regular inspections and cleaning of culverts (at least twice a year). Maintain logbook.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No blocked culverts impeding flow.				
Access Roads	Simunye Shaft	Wetlands	quality deterioration. Erosion at	modify. Manage stormwater	Survey existing stormwater discharge points for erosion damage and implement corrective actions.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No erosion at stormwater discharge points.				
	Complex		stormwater discharge points. Culvert blockages leading to impoundment and/or flow concentration	runoff, prevent erosion, maintain culverts at optimal functionality.	Report and address all spills and leaks of contaminants occurring on the access road.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No contamination of downstream wetland.				
Security Fence and Access;					Implement stormwater management plan and maintain stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Well-functioning stormwater system.				
Offices, Workshops and Changehouses;			Stormwater runoff from		Regularly (at least twice a year) undertake inspections and maintenance of stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Twice a year throughout project lifetime.	Well-functioning stormwater system.				
Internal Roads and Parking Areas; Man and			entering wetlands and		Survey existing stormwater discharge points for erosion damage and implement corrective actions.	WUL, RQO, Best Practice Guidelines	Twice a year throughout project lifetime.	No erosion at stormwater discharge points.				
Material Shaft Infrastructure;			quality deterioration.	Control and modify. Manage	Separate clean and dirty water areas. No dirty water to be discharged.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No contamination of downstream wetland.				
Ventilation Shaft; Potable Water	Infrastructure; Ventilation Simunye Shaft; Potable Shaft Wetlands Water Complex Reservoir; Attenuation Dam/ Structure Storm Water Berms and Canals Service Water	Wetlands	Erosion at stormwater discharge	stormwater runoff, prevent erosion, limit	Minimise extent of dirty water isolation areas.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Habitat integrity of downstream wetland to be maintained.				
Attenuation Dam/ Structure			points. Disturbance of wetland biota in	water quality impacts.	Ensure all clean runoff is discharge into the environment. Discharge in an environmentally sustainable manner.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Habitat integrity of downstream wetland to be maintained.				
Berms and Canals Service Water		adjacent wetland habitat. Littering in		Undertake litter clean up operations in wetland immediately adjacent to Simunye shaft at least once a year during spring.	WUL, RQO, Best Practice Guidelines	Once a year throughout project lifetime.	Well-functioning stormwater system. Well-functioning stormwater system. No erosion at stormwater discharge points. No contamination of downstream wetland. Habitat integrity of downstream wetland to be maintained. Habitat integrity of downstream wetland to be maintained. No contamination of downstream wetland.					
Dam (Top) Service Water Dam (Bottom)			adjacent wetland habitat.		Develop a spill response plan to ensure rapid and appropriate response to any spills of potential contaminants.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No contamination of downstream wetland.				



	OPERATIONAL PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					Separate clean and dirty water areas. No dirty water to be discharged.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.				
Fuel & Oil		Stormwater runoff from infrastructures entering		Minimise extent of dirty water isolation areas.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.					
Storage Stonedust Dump	& Oil age edust Simunye p Complex Wetlands age Yard nporary age of te) Leakage contamin from PCDs	wetlands -water quality deterioration.		Ensure all clean runoff is discharge into the environment. Discharge in an environmentally sustainable manner.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.					
Storage Yard (Temporary storage of hazardous waste)		Leakage and seepage of contaminants from PCDs and	Control and	Conduct biomonitoring and water quality monitoring of Waterval River and its tributaries according to a biomonitoring plan and a surface water and groundwater monitoring plan.	WUL, RQO, Best Practice Guidelines	es project lifetime. No degradation of habita adjacent wetlands from current state.	No degradation of habitat or water quality in adjacent wetlands from current state.					
Storage Yard (Temporary storage of general, domestic and industrial		rrom PC dirty areas adja wetla Erosi	dirty water areas into adjacent wetlands. Erosion at	modify Successfully	Ensure PCD is managed within design and specifications and that an appropriate freeboard is maintained. Minimise occurrences of overflow. No overflow for storm with recurrence interval less than 50 years.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.				
waste) Sewage	Simunye		stormwater discharge points. Disturbance of	isolate dirty water areas.	Compile an emergency preparedness plan to cater for potential large-scale spills.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.				
Plant Oil and Silt Traps	Shaft Complex	Wetlands	wetland biota in adjacent wetland habitat. Littering in	Zero discharge of dirty water.	Conduct regular inspections of all PCD's to ensure full compliance with legislation and design specifications.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.				
	adjacent wetland habitat.			Develop a rehabilitation response plan should water quality deterioration as a result of the mining activities in the receiving environment be detected.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No degradation of habitat or water quality in adjacent wetlands from current state.					
					Undermining of wetlands as authorised.	WUL, RQO, Best Practice Guidelines		Prevent surface subsidence in wetlands.				



	OPERATIONAL PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
			Decreased flow in wetlands due	<i>y</i>	Surface subsidence under wetlands and in close proximity to wetlands must be avoided and a suitable pillar safety factor should be implemented to ensure this. As a minimum, it is recommended that no subsidence or sinkholes be allowed to take place within delineated wetland areas and a 100m buffer. Stability of the overlying strata must be ensured in the long-term, i.e. permanently.	WUL, RQO, Best Practice Guidelines	Design Phase and through project lifetime.	Prevent surface subsidence in wetlands.				
			to groundwater drawdown		No high extraction mining to take place	WUL, RQO, Best Practice Guidelines		Prevent surface subsidence				
			altered flow within wetlands due to surface subsidence, decreased flow	Control and modify -	A detailed subsidence risk assessment based on the latest version of the mine plan should be undertaken to determine the location and surface expression of any subsidence that may occur.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent surface subsidence in wetlands.				
Underground Mining	Simunye Shaft Complex	Wetlands	in wetlands due to surface subsidence, Water quality deterioration due to decant, habitat degradation.	prevent subsidence, minimise drawdown of groundwater, minimise flow reduction in wetlands	Where a likely loss of groundwater inputs/baseflow to the wetlands is expected, the relative significance of this loss should be determined and quantified to allow for the evaluation and possible implementation of alternative mitigation measures to address flow losses from groundwater drawdown	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Limit flow reduction in wetlands				
			Decreased flow in wetlands due to groundwater drawdown Altered flow within wetlands due to surface subsidence.		The likelihood of decant, as well as its location and expected quality should be accurately determined at a high level of confidence and measures put in place to ensure that no decant or discharge of contaminated water occurs, unless it meets the applicable resource quality objectives (RQO's).	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Limit flow reduction in wetlands				
					Should treatment of surplus mine water be required, the discharge of treated water into the environment should be investigated and implemented.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Limit flow reduction in wetlands.				
					A detailed regional water monitoring strategy should be developed for the Shondoni Colliery. This should consider all aspects related to water (surface water, groundwater, aquatic ecology, wetlands etc.) and should tie in with	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Limit flow reduction in wetlands.				



	OPERATIONAL PHASE - WETLANDS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
			Decreased flow	Control and modify - prevent	monitoring strategies of adjacent mines. Such a monitoring strategy must include flow monitoring stations.						
Underground Mining	Simunye Shaft Complex	Wetlands	in wetlands due to surface subsidence. Water quality deterioration due to decant. Habitat degradation	subsidence, minimise drawdown of groundwater, minimise flow reduction in wetlands Prevent subsidence, minimise drawdown of groundwater, minimise flow reduction in wetlands	Studies should be commissioned to better understand the long-term consequences of surface subsidence on wetlands, including the development of preferential flow paths into mine workings resulting in loss of surface flow. Persistence of such flow paths over time should also be investigated.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Limit flow reduction in wetlands.			
					Manage topsoil stockpile as per recommendations in soil specialist study.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent sediment transport in adjacent wetlands.			
			Mobilisation of		Install sediment barriers around downslope edge of stockpiles to trap any sediment transported off the stockpiles by runoff.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent sediment transport in adjacent wetlands.			
m 11/	<i>c</i> :		sediments off the stockpiles entering	Control and modify. Manage	Regularly inspect and repair sediment barriers.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent sediment transport in adjacent wetlands.			
Topsoil/ Overburden Stockpile	Simunye Shaft Complex	Wetlands	adjacent wetlands via runoff, habitat	stormwater runoff, prevent erosion, limit water quality	Any stockpiles containing carbonaceous material should be considered dirty water areas and isolated from clean water systems and runoff.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent water quality deterioration in adjacent wetlands.			
			adjacent wetlands	impacts.	Control and manage alien vegetation on stockpiles as per alien vegetation management plan.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent establishment of alien invasive trees.			



	OPERATIONAL PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					Develop an emergency response plan for any pipeline failure and large leaks.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent wetland degradation due to pipeline leaks / failure.				
Potable Water					Conduct regular inspections of pipelines for leaks and damage.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent wetland degradation due to pipeline leaks / failure.				
Supply System (Pipelines) Service Water	Simunye		Pipeline leaks leading to water quality impacts	Control and modify. Prevent	Install pressure / flow monitoring equipment for automatic detection of leaks / failure.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent wetland degradation due to pipeline leaks / failure.				
Reticulation System (Pipelines)	Shaft Complex	Wetlands	Disturbance to wetlands during	spills and leaks. Emergency preparedness.	Control alien vegetation along pipeline and powerline servitudes.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent wetland degradation due to pipeline leaks / failure.				
Electricity Supply			activities		Make use of existing rods and tracks to access pipelines and powerline for maintenance purposes.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent wetland degradation due to pipeline leaks / failure.				
				Should maintenance activities require any excavations within wetland areas such work must be undertaken under the guidance of a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent wetland degradation due to pipeline leaks / failure.					
					PROPOSED ACTIVITIES							
					Undermining of wetlands as authorised.	WUL, RQO, Best Practice Guidelines		Prevent surface subsidence in wetlands.				
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Wetlands	Decreased flow in wetlands due to groundwater drawdown	Control and modify	Surface subsidence under wetlands and in close proximity to wetlands must be avoided and a suitable pillar safety factor should be implemented to ensure this. As a minimum, it is recommended that no subsidence or sinkholes be allowed to take place within delineated wetland areas and a 100m buffer. Stability of the overlying strata must be ensured in the long-term, i.e. permanently.	WUL, RQO, Best Practice Guidelines	Design Phase and through project lifetime.	Prevent surface subsidence in wetlands.				
					No high extraction mining to take place under watercourses.	WUL, RQO, Best Practice Guidelines	Design Phase and through project lifetime.	Prevent surface subsidence in wetlands.				
					A detailed subsidence risk assessment based on the latest version of the mine plan should be undertaken to determine the location and surface expression of any subsidence that may occur.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Prevent surface subsidence in wetlands.				
					Where a likely loss of groundwater inputs/baseflow to the wetlands is	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Limit flow reduction in wetlands.				



	OPERATIONAL PHASE - WETLANDS												
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved					
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Wetlands	Altered flow within wetlands due to surface subsidence Decreased flow in wetlands due to surface subsidence Water quality deterioration due to decant, habitat degradation	Prevent subsidence Minimise drawdown of groundwater Minimise flow reduction in wetlands Minimise flow reduction in wetlands	expected, the relative significance of this loss should be determined and quantified to allow for the evaluation and possible implementation of alternative mitigation measures to address flow losses from groundwater drawdown. The likelihood of decant, as well as its location and expected quality should be accurately determined at a high level of confidence and measures put in place to ensure that no decant or discharge of contaminated water occurs, unless it meets the applicable resource quality objectives (RQO's). Should treatment of surplus mine water be required, the discharge of treated water into the environment should be investigated and implemented A detailed regional water monitoring strategy should be developed for the Shondoni Colliery. This should consider all aspects related to water (surface water, groundwater, aquatic ecology, wetlands etc.) and should tie in with monitoring strategies of adjacent mines. Such a monitoring strategy must include flow monitoring stations. Studies should be commissioned to better understand the long-term consequences of surface subsidence on wetlands, including the development of preferential flow paths into mine workings resulting in loss of surface flow. Persistence of such	WUL, RQO, Best Practice Guidelines WUL, RQO, Best Practice Guidelines WUL, RQO, Best Practice Guidelines WUL, RQO, Best Practice Guidelines	Throughout project lifetime. Throughout project lifetime. Throughout project lifetime.	Limit flow reduction in wetlands. Limit flow reduction in wetlands. Limit flow reduction in wetlands.					
West Upcast Ventilation	Shondoni Colliery - Farm Brakspruit	Wetlands	Stormwater runoff from infrastructures entering wetlands and	Control and modify Manage	investigated. Implement stormwater management plan and maintain stormwater infrastructure. Regularly (at least twice a year) undertake inspections and maintenance of stormwater infrastructure.	WUL, RQO, Best Practice Guidelines WUL, RQO, Best Practice Guidelines	Throughout project lifetime. Twice a year throughout project lifetime.	Well-functioning stormwater system. Well-functioning stormwater system.					
Shaft	359 IR Portion 11		leading to water quality deterioration	stormwater runoff	Survey existing stormwater discharge points for erosion damage and implement corrective actions	WUL, RQO, Best Practice Guidelines	Twice a year throughout project lifetime.	No erosion at stormwater discharge points					



OPERATIONAL PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
			Erosion at		Separate clean and dirty water areas. No dirty water to be discharged.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No contamination of downstream wetland.			
	Shondoni Colliery -		stormwater discharge points	Prevent	Minimise extent of dirty water isolation areas.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Habitat integrity of downstream wetland to be maintained.			
West Upcast Ventilation	Farm Brakspruit 359 IR	Wetlands	Disturbance of wetland biota in	erosion Limit water	Ensure all clean runoff is discharge into the environment. Discharge in an environmentally sustainable manner.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Habitat integrity of downstream wetland to be maintained.			
Shaft	Portion 11 adjacent wetland habita Littering in adjacent wetland babita	adjacent wetland habitat Littering in adjacent	quality impacts	Jacts Undertake litter clean up operations in wetland immediately adjacent to West Ventilation shaft at least once a year during spring. WUL, RQO, Best Practice Guidelines Once a year throughout project lifetime.		No contamination of downstream wetland.					
			wetland habitat		Develop a spill response plan to ensure rapid and appropriate response to any spills of potential contaminants.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No contamination of downstream wetland.			
					Implement stormwater management plan and maintain stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Well-functioning stormwater system.			
					Regularly (at least twice a year) undertake inspections and maintenance of stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Twice a year throughout project lifetime.	Well-functioning stormwater system.			
			Stormwater runoff from infrastructures		Survey existing stormwater discharge points for erosion damage and implement corrective actions	WUL, RQO, Best Practice Guidelines	Twice a year throughout project lifetime.	No erosion at stormwater discharge points			
			entering wetlands and		Separate clean and dirty water areas. No dirty water to be discharged.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No contamination of downstream wetland.			
	Shondoni		quality deterioration.	Control and	Minimise extent of dirty water isolation areas.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Habitat integrity of downstream wetland to be maintained.			
West Downcast Ventilation Shaft	Farm Brakspruit	Wetlands	stormwater discharge	Manage stormwater	Ensure all clean runoff is discharge into the environment. Discharge in an environmentally sustainable manner.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Habitat integrity of downstream wetland to be maintained.			
Share	Portion 8	wedands	Disturbance of wetland biota in adjacent wetland habitat	erosion, limit water quality impacts.	Undertake litter clean up operations in wetland immediately adjacent to West Ventilation shaft at least once a year during spring.	WUL, RQO, Best Practice Guidelines	Once a year throughout project lifetime.	No contamination of downstream wetland.			
			Littering in adjacent wetland habitat.		Develop a spill response plan to ensure rapid and appropriate response to any spills of potential contaminants.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No contamination of downstream wetland.			



	OPERATIONAL PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					Implement stormwater management plan and maintain stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Well-functioning stormwater system.				
			Stormwater runoff from infrastructures		Regularly (at least twice a year) undertake inspections and maintenance of stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Twice a year throughout project lifetime.	Well-functioning stormwater system.				
			entering wetlands and leading to water		Survey existing stormwater discharge points for erosion damage and implement corrective actions	WUL, RQO, Best Practice Guidelines	Twice a year throughout project lifetime.	No erosion at stormwater discharge points				
	Shondoni		quality deterioration.	Control and modify. Manage	Separate clean and dirty water areas. No dirty water to be discharged.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No contamination of downstream wetland.				
North Upcast C Ventilation Kr Shaft P	Colliery - Farm Kromdraai	Wetlands	Erosion at stormwater discharge	stormwater runoff, prevent erosion, limit	Minimise extent of dirty water isolation areas.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Standard to be achieved Well-functioning stormwater system. Well-functioning stormwater system. No erosion at stormwater discharge points No contamination of downstream wetland. Habitat integrity of downstream wetland to be maintained. Habitat integrity of downstream wetland to be maintained. No contamination of downstream wetland. No contamination of downstream wetland. Well-functioning stormwater system. Well-functioning stormwater system. No erosion at stormwater discharge points No contamination of downstream wetland. Habitat integrity of downstream wetland. Habitat integrity of downstream wetland. Habitat integrity of downstream wetland. Habitat integrity of downstream wetland to be maintained. Habitat integrity of downstream wetland to be maintained. No contamination of downstream wetland to be maintained. Habitat integrity of downstream wetland to be maintained. No contamination of downstream wetland to be maintained.				
	Portion 4		points. Disturbance of wetland biota in	water quality impacts.	Ensure all clean runoff is discharge into the environment. Discharge in an environmentally sustainable manner.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.					
			adjacent wetland habitat. Littering in adjacent		Undertake litter clean up operations in wetland immediately adjacent to North Ventilation shaft at least once a year during spring.	WUL, RQO, Best Practice Guidelines	Once a year throughout project lifetime.	No contamination of downstream wetland.				
			wetland habitat.		Develop a spill response plan to ensure rapid and appropriate response to any spills of potential contaminants.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No contamination of downstream wetland.				
			Stormwater		Implement stormwater management plan and maintain stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Well-functioning stormwater system.				
			infrastructures entering wetlands and		Regularly (at least twice a year) undertake inspections and maintenance of stormwater infrastructure.	WUL, RQO, Best Practice Guidelines	Twice a year throughout project lifetime.	Well-functioning stormwater system.				
North	Shondoni		leading to water quality deterioration.	Control and	Survey existing stormwater discharge points for erosion damage and implement corrective actions	WUL, RQO, Best Practice Guidelines	Twice a year throughout project lifetime.	No erosion at stormwater discharge points				
Downcast	Farm	Watlanda	Erosion at stormwater	stormwater	Separate clean and dirty water areas. No dirty water to be discharged.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Well-functioning stormwater system. Well-functioning stormwater system. No erosion at stormwater discharge points No contamination of downstream wetland. Habitat integrity of				
Ventilation Shaft 128 IS Portion 4	128 IS Portion 4	wenands	discharge points. Disturbance of	erosion, limit water quality	Minimise extent of dirty water isolation areas.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Habitat integrity of downstream wetland to be maintained.				
			wetland biota in adjacent wetland habitat.	impacts. –	Ensure all clean runoff is discharge into the environment. Discharge in an environmentally sustainable manner.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	Habitat integrity of downstream wetland to be maintained.				
		wetiand nabitat. Littering in adjacent wetland habitat.		Undertake litter clean up operations in wetland immediately adjacent to North	WUL, RQO, Best Practice Guidelines	Once a year throughout project lifetime.	No contamination of downstream wetland.					



	OPERATIONAL PHASE - WETLANDS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
					Ventilation shaft at least once a year during spring.						
					Develop a spill response plan to ensure rapid and appropriate response to any spills of potential contaminants.	WUL, RQO, Best Practice Guidelines	Throughout project lifetime.	No contamination of downstream wetland.			



	•	•	0	OPERATIONAL PH	IASE – AIR QUALITY					
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
SHONDONI SHAFT COMPLEX										
Access Roads	Shondoni Shaft Complex	Entrained dust emissions. Gaseous vehicle exhaust.	Increased ground level particulate and gaseous concentrations.	Reduction of entrained dust and gaseous exhaust emissions.	Keep road surfaces clean. Clean any spillages promptly. Implementation of strict speed limits.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non- residential limit of 1200 mg/m ² /day. PM ₁₀ , PM _{2.5} , NO ₂ , CO and SO ₂ concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.		
Internal Roads and Parking Areas	Shondoni Shaft Complex	Entrained dust emissions. Gaseous vehicle exhaust.	Increased ground level particulate and gaseous concentrations.	Reduction of entrained dust and gaseous exhaust emissions.	Keep road surfaces clean. Clean any spillages promptly. Implementation of strict speed limits. Keep vehicle idling times to a minimum.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non- residential limit of 1200 mg/m ² /day. PM ₁₀ , PM ₂₅ , NO ₂ , CO and SO ₂ concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.		
Fuel & Oil Storage	Shondoni Shaft Complex	Volatile organic emissions.	Increased ground level volatile organic compound concentrations.	VOC source management	Immediate clean-up of any spillages. Implementation of a leak detection and repair program for storage tanks.	Benzene concentrations below SA NAAQS at sensitive receptor locations.	Throughout the life of mine	Compliance with the SA NAAQS for benzene. Other VOC concentrations below international guidelines at sensitive receptor locations.		
Man and Material Shaft Infrastructure	Shondoni Shaft Complex	Particulate and gaseous emissions.	Increased ground level particulate and gaseous concentrations.	None	None	Dust fallout at residential locations below NDCR residential limit of $600 \text{mg/m}^2/\text{day}$. Dust fallout at other locations below non- residential limit of 1200 $\text{mg/m}^2/\text{day}$. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.		

Table 5.2(1): Operational Phase Impact Management Measures Table – Air Quality



				OPERATIONAL PH	ASE - AIR QUALITY			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Management Objective/ Measures Outcome)		Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Explosives Off- Load Area	Shondoni Shaft Complex	nondoni Fugitive dust Increas haft emissions. concen		Dust source management	Immediate clean-up of any spillages. Keep material being handled covered.	Dust fallout at residential locations below NDCR residential limit of $600 \text{mg/m}^2/\text{day}$. Dust fallout at other locations below non-residential limit of 1200 mg/m ² /day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.
Conveyor System	Shondoni Shaft Complex	Fugitive dust emissions.	Increased ground level particulate concentrations and dust fallout, particularly during high wind speed events.Minimisation of fugitive dust during high wind speed events.Covering of conveyor sides to prevent wind erosion during high wind speed events.Dust fallout at residential locations below NDCR residential limit of 600mg/m²/day. Dust fallout at other locations below non- residential limit of 1200 mg/m²/day. PM10 and PM2.5 concentrations in compliance with the SA NAAQS.		Currently implemented	Compliance with SA NDCR and SA NAAQS.		
Ventilation Shaft	Shondoni Shaft Complex	Particulate and gaseous emissions.	articulate and aseous missions. Increased ground level particulate and gaseous concentrations. None None None None None None None Dust fallout at residential limit of 600mg/m²/day. Dust fallout other locations below non-residential limit of 1200 mg/m²/day. PM ₁₀ and PM _{2.5} concentrations in complianc with the SA NAAQS.		Dust fallout at residential locations below NDCR residential limit of $600 \text{mg/m}^2/\text{day}$. Dust fallout at other locations below non-residential limit of 1200 mg/m $^2/\text{day}$. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.	
Topsoil/ Overburden Stockpile	Shondoni Shaft Complex	Fugitive dust emissions.	Increased ground level particulate concentrations and dust fallout, particularly during high wind speed events.	Minimisation of fugitive dust during high wind speed events.	Revegetation, rock cladding or installation of wind breaks to reduce wind erosion.	Dust fallout at residential locations below NDCR residential limit of $600 \text{mg/m}^2/\text{day}$. Dust fallout at other locations below non- residential limit of 1200 mg/m ² /day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.



				OPERATIONAL PH	ASE - AIR QUALITY			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Coal Storage in Surface Bunker	Shondoni Shaft Complex	Fugitive dust emissions.	Increased ground level particulate concentrations and dust fallout, particularly during high wind speed events.	Minimisation of fugitive dust during high wind speed events.	Installation of wind breaks to reduce wind erosion. Immediate clean-up of any spillages.	Dust fallout at residential locations below NDCR residential limit of $600 \text{mg/m}^2/\text{day}$. Dust fallout at other locations below non- residential limit of 1200 mg/m ² /day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.
Coal Stockpile and Throw-Out Area	Shondoni Shaft Complex	Fugitive dust emissions.	Increased ground level particulate concentrations and dust fallout, particularly during high wind speed events.	Minimisation of fugitive dust during high wind speed events.	Installation of wind breaks to reduce wind erosion.	Dust fallout at residential locations below NDCR residential limit of $600 \text{mg/m}^2/\text{day}$. Dust fallout at other locations below non-residential limit of 1200 mg/m²/day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.
Stonedust Dump	Shondoni Shaft Complex Fugitive dust emissions. Fugitive dust emissions. Fugitive dust emissions.		Increased ground level particulate concentrations and dust fallout, particularly during high wind speed events.	Minimisation of fugitive dust during high wind speed events.	Installation of wind breaks to reduce wind erosion. Immediate clean-up of any spillages.	Dust fallout at residential locations below NDCR residential limit of $600 \text{mg/m}^2/\text{day}$. Dust fallout at other locations below non-residential limit of 1200 mg/m²/day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.
Sewage Treatment Plant	Shondoni Shaft Complex	Odorous and VOC emissions.	Increased VOC concentrations and odours at sensitive receptor locations.	VOC source management	Immediate clean-up of any spillages. Use of best available treatment technologies where possible.	Benzene concentrations below SA NAAQS at sensitive receptor locations. No noticeable odour at sensitive receptor locations.	Throughout the life of the operations.	Compliance with the SA NAAQS for benzene. Concentration of odorous compounds below odour detection limit at sensitive receptor locations.



				OPERATIONAL PH	ASE - AIR QUALITY			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Iso Yard (Temporary storage of general, domestic and industrial waste)	Shondoni Shaft Complex	Odorous and VOC emissions.	Increased VOC concentrations and odours at sensitive receptor locations.	VOC source management	Immediate clean-up of any spillages. Appropriate disposal of solid waste and hazardous waste, based on classification.	Benzene concentrations below SA NAAQS at sensitive receptor locations. No noticeable odour at sensitive receptor locations.	Throughout the life of the operations.	Compliance with the SA NAAQS for benzene. Concentration of odorous compounds below odour detection limit at sensitive receptor locations.
Iso Yard (Temporary storage of hazardous waste)	Shondoni Shaft Complex	Odorous and VOC emissions.	Increased VOC concentrations and odours at sensitive receptor locations. VOC source management VOC source concentrations. VOC source management voc concentrations and odours at sensitive receptor locations. VOC source management voc concentrations below source based on classification. VOC source voc concentrations below source voc concentrations and odours at sensitive receptor locations. Voc source voc concentrations below source voc concentrations waste, based on classification.		Benzene concentrations below SA NAAQS at sensitive receptor locations. No noticeable odour at sensitive receptor locations.	Throughout the life of the operations.	Compliance with the SA NAAQS for benzene. Concentration of odorous compounds below odour detection limit at sensitive receptor locations.	
				SIMUNYE SH	AFT COMPLEX			
Access Roads	Simunye Shaft Complex	Entrained dust emissions. Gaseous vehicle exhaust.	Increased ground level particulate and gaseous concentrations.	Reduction of entrained dust and gaseous exhaust emissions.	Keep road surfaces clean. Clean any spillages promptly. Implementation of strict speed limits.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non- residential limit of 1200 mg/m ² /day. PM ₁₀ , PM _{2.5} , NO ₂ , CO and SO ₂ concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.
Internal Roads and Parking Areas	Simunye Shaft Complex	Entrained dust emissions. Gaseous vehicle exhaust.	Increased ground level particulate and gaseous concentrations.	Reduction of entrained dust and gaseous exhaust emissions.	Keep road surfaces clean. Clean any spillages promptly. Implementation of strict speed limits.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non- residential limit of 1200 mg/m ² /day. PM ₁₀ , PM _{2.5} , NO ₂ , CO and SO ₂ concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.



				OPERATIONAL PH	IASE - AIR QUALITY			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Fuel Storage	Simunye Shaft Complex	Volatile organic emissions.	Increased ground level volatile organic compound concentrations.	VOC source management	Immediate clean-up of any spillages. Implementation of a leak detection and repair program for storage tanks.	Benzene concentrations below SA NAAQS at sensitive receptor locations.	Throughout the life of mine	Compliance with the SA NAAQS for benzene. Other VOC concentrations below international guidelines at sensitive receptor locations.
Man and Material Shaft Infrastructure	Simunye Shaft Complex	Particulate and gaseous emissions.	Increased ground level particulate and gaseous concentrations.	None	None	Dust fallout at residential locations below NDCR residential limit of $600 \text{mg/m}^2/\text{day}$. Dust fallout at other locations below non-residential limit of 1200 mg/m ² /day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.
Ventilation Shaft	Simunye Shaft Complex	Particulate and gaseous emissions.	Increased ground level particulate and gaseous concentrations.	reased ground el particulate d gaseous icentrations.		Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.	
Topsoil/ Overburden Stockpile	Simunye Shaft Complex	Fugitive dust emissions.	Increased ground level particulate concentrations and dust fallout, particularly during high wind speed events.	None	Revegetation, rock cladding or installation of wind breaks to reduce wind erosion.	Dust fallout at residential locations below NDCR residential limit of $600 \text{mg/m}^2/\text{day}$. Dust fallout at other locations below non-residential limit of 1200 mg/m²/day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.



				OPERATIONAL PH	ASE - AIR QUALITY			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Stonedust Dump	Simunye Shaft Complex	Fugitive dust emissions.	Increased ground level particulate concentrations and dust fallout, particularly during high wind speed events.	Minimisation of fugitive dust during high wind speed events.	Installation of wind breaks to reduce wind erosion. Immediate clean-up of any spillages.	Dust fallout at residential locations below NDCR residential limit of $600 \text{mg/m}^2/\text{day}$. Dust fallout at other locations below non- residential limit of 1200 mg/m ² /day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.
Sewage Treatment Plant	Shondoni Shaft Complex	Odorous and VOC emissions.	Increased VOC concentrations and odours at sensitive receptor locations.	VOC source management	Immediate clean-up of any spillages. Use of best available treatment technologies.	Benzene concentrations below SA NAAQS at sensitive receptor locations. No noticeable odour at sensitive receptor locations.	Throughout the life of the operations.	Compliance with the SA NAAQS for benzene. Concentration of odorous compounds below odour detection limit at sensitive receptor locations.
Storage Yard (Temporary storage of general, domestic and industrial waste)	Shondoni Shaft Complex	Odorous and VOC emissions.	Increased VOC concentrations and odours at sensitive receptor locations.	VOC source management	Immediate clean-up of any spillages. Appropriate disposal of solid waste and hazardous waste, based on classification.	Benzene concentrations below SA NAAQS at sensitive receptor locations. No noticeable odour at sensitive receptor locations.	Throughout the life of the operations.	Compliance with the SA NAAQS for benzene. Concentration of odorous compounds below odour detection limit at sensitive receptor locations.
Storage Yard (Temporary storage of hazardous waste)	Shondoni Shaft Complex	Odorous and VOC emissions.	Increased VOC concentrations and odours at sensitive receptor locations.	VOC source management	Immediate clean-up of any spillages. Appropriate disposal of solid waste and hazardous waste, based on classification.	Benzene concentrations below SA NAAQS at sensitive receptor locations. No noticeable odour at sensitive receptor locations.	Throughout the life of the operations.	Compliance with the SA NAAQS for benzene. Concentration of odorous compounds below odour detection limit at sensitive receptor locations.



	OPERATIONAL PHASE - AIR QUALITY										
Project Activity	Project Location Activity		Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
	PROPOSED ACTIVITIES										
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Particulate and gaseous emissions.	Increased ground level particulate and gaseous concentrations.	None	None	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non- residential limit of 1200 mg/m ² /day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.			
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Particulate and gaseous emissions.	Increased ground level particulate and gaseous concentrations.	None	None	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non- residential limit of 1200 mg/m ² /day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS.	Throughout the life of mine	Compliance with SA NDCR and SA NAAQS.			



	<u> </u>		-	<u> </u>	OPERATIONAL PHASE - NOISE					
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
SHONDONI SHAFT COMPLEX										
Conveyor	onveyor Shondoni Noise disturbance due to increase		Noise disturbance due to increase	No mitigation	Mitigation measures already implemented. No further mitigation required	National Noise Regulations	N/A	Noise Regulations Prevent noise disturbance. Increase in ambient level not to exceed 7dB (Moderate Impact)		
System	Complex		in ambient noise level	required	Carry out annual noise monitoring to verify continued compliance	SANS 10103 Guidelines		SANS 10103 Increase in ambient level not to exceed 3dB (Minor Impact)		
Ventilation	Shondoni Shaft	Noise	Noise disturbance due to increase	No mitigation	No mitigation required	National Noise Regulations	N/A	Noise Regulations Prevent noise disturbance. Increase in ambient level not to exceed 7dB (Moderate Impact)		
Snart	Complex		in ambient noise level	requirea	Carry out annual noise monitoring to verify continued compliance	SANS 10103 Guidelines		SANS 10103 Increase in ambient level not to exceed 3dB (Minor Impact)		
					SIMUNYE SHAFT COMPLEX					
Ventilation	Simunye Shaft	Noise	Noise disturbance due to increase	No mitigation	Mitigation measures already implemented. No further mitigation required	National Noise Regulations	N/A	Noise Regulations Prevent noise disturbance. Increase in ambient level not to exceed 7dB (Moderate Impact)		
Silait	Complex		in ambient noise level	required	Carry out annual noise monitoring to verify continued compliance	SANS 10103 Guidelines		SANS 10103 Increase in ambient level not to exceed 3dB (Minor Impact)		
					PROPOSED ACTIVITIES					
West Upcast	Shondoni Colliery - Farm	Neize	Noise disturbance	Control the	Specify Limits •Specify noise limits dBA at specified distances in Ventilation System tender docs. •Verify design precautions taken •Verify implementation	National Noise Regulations	To be actioned during the design and tender	Noise Regulations Prevent noise disturbance. Increase in ambient level not to exceed 7dB (Moderate Impact)		
Ventilation Shaft		NOISE	due to increase in ambient noise level		Noise Audit •Carry out Audit •Verify targets met Noise Monitoring •Carry out annual noise monitoring to verify continued compliance	SANS 10103 Guidelines	aqualization phases. To be verified before start of construction.	SANS 10103 Increase in ambient level not to exceed 3dB (Minor Impact)		

Table 5.2(m): Operational Phase Impact Management Measures Table – Noise



					OPERATIONAL PHASE - NOISE			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
North Upcast Ventilation Shaft	Shondoni Colliery - Farm N Kromdraai 128 IS Portion 4	ondoni lliery - rm Noise du omdraai 8 IS no rtion 4	Noise		Specify Limits •Specify noise limits dBA at specified distances in Ventilation System tender docs. •Verify design precautions taken •Verify implementation	National Noise Regulations	To be actioned during the design and tender	Noise Regulations Prevent noise disturbance. Increase in ambient level not to exceed 7dB (Moderate Impact)
			disturbance due to increase in ambient noise level	Control the noise impact	Noise Audit •Carry out Audit •Verify targets met Noise Monitoring •Carry out annual noise monitoring to verify continued compliance	SANS 10103 Guidelines	adjudication phases. To be verified before start of construction	SANS 10103 Increase in ambient level not to exceed 3dB (Minor Impact)



	•	•	0	OPERATIONAL	L PHASE - VISUALS						
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
	SHONDONI SHAFT COMPLEX										
Access Roads	Shondoni Shaft Complex	Visibility. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Security Fence and Access	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Offices, Workshops and Changehouses	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Internal Roads and Parking Areas	Shondoni Shaft Complex	Visibility. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			

Table 5.2(n): Operational Phase Impact Management Measures Table – Visuals



	OPERATIONAL PHASE - VISUALS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Electricity Supply	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				
Fuel & Oil Storage	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				
Explosives Off-Load Area	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				
Man and Material Shaft Infrastructure	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				



	OPERATIONAL PHASE - VISUALS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Conveyor System	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				
Ventilation Shaft	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				
Topsoil/ Overburden Stockpile	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Elements that generate windblown dust (dumps and stockpiles). Infrastructure with a physical size/ height that create a Visual Intrusion in the landscape - highly visible from close, medium and long- range views. Activities that shape landforms (stockpiles and dumps) that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Restrict the extent of visible dust migration. Manage Landshaping Activities. Manage Good Housekeeping.	Implement Dust Suppression according to the Dust Suppression Protocol. Implement the Shaping of Landforms according to Landform Shaping Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape. Final Vegetative Cover to present similar to the surrounding landscape.				



	OPERATIONAL PHASE - VISUALS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Coal Storage in Surface Bunker	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size or height as to create a Visual Intrusion in the landscape. Thus, these elements are highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				
Coal Stockpile and Throw- Out Area	Shondoni Shaft Complex	Visibility. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Elements that generate Windblown Dust (dumps and stockpiles). Infrastructure with a physical size/ height as to create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Restrict the extent of visible dust migration. Manage Good Housekeeping.	Implement Dust Suppression according to the Dust Suppression Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				
Stonedust Dump	Shondoni Shaft Complex	Visibility. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Elements that generate Windblown Dust (dumps and stockpiles). Infrastructure with a physical size/ height as to create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Restrict the extent of visible dust migration. Manage Good Housekeeping.	Implement Dust Suppression according to the Dust Suppression Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				



OPERATIONAL PHASE - VISUALS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards 	Timeframe for Implementation	Standard to be achieved		
Potable Water Supply System (Pipelines)	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.		
Potable Water Reservoir	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.		
Shondoni PCD	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size or height as to create a Visual Intrusion in the landscape. Thus, these elements are highly visible from close, medium and long- range views. Mining Activities that are subject to shaping of landforms. These activities include for instance stockpiles and dumps that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Manage Landshaping Activities. Manage Good Housekeeping.	Implement the Shaping of Landforms according to Landform Shaping Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape.		



OPERATIONAL PHASE - VISUALS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
Shondoni Incline PCD	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size or height as to create a Visual Intrusion in the landscape. Thus, these elements are highly visible from close, medium and long- range views. Mining Activities that are subject to shaping of landforms. These activities include for instance stockpiles and dumps that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Manage Landshaping Activities. Manage Good Housekeeping.	Implement the Shaping of Landforms according to Landform Shaping Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape.		
Surface Service Water Reservoir	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.		
Service Water Reticulation System (Pipelines)	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.		



OPERATIONAL PHASE - VISUALS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
Storm Water Berms and Canals	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure with a physical size/ height as to create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views. Activities that are subject to shaping of landforms (stockpiles and dumps) that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Manage Landshaping Activities. Manage Good Housekeeping.	Implement the Shaping of Landforms according to Landform Shaping Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape. Final Vegetative Cover to present similar to the surrounding landscape.		
Attenuation Dam/ Structure	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure with a physical size/ height as to create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views. Activities that are subject to shaping of landforms (stockpiles and dumps) that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area	Manage Landshaping Activities. Manage Good Housekeeping.	Implement the Shaping of Landforms according to Landform Shaping Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape.		



	OPERATIONAL PHASE - VISUALS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Oil and Silt Traps	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Sewage Treatment Plant	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Iso Yard (Temporary storage of general, domestic and industrial waste)	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Iso Yard (Temporary storage of hazardous waste)	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			



	OPERATIONAL PHASE - VISUALS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Capital Yard (Temporary storage of scrap metal)	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
SIMUNYE SHAFT COMPLEX											
Access Roads	Simunye Shaft Complex	Visibility. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Security Fence and Access	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Offices, Workshops and Changehouses	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			



	OPERATIONAL PHASE - VISUALS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Internal Roads and Parking Areas	Simunye Shaft Complex	Visibility. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				
Electricity Supply	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				
Man and Material Shaft Infrastructure	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				
Ventilation Shaft	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				



	OPERATIONAL PHASE - VISUALS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Topsoil/ Overburden Stockpile	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Elements that generate windblown dust (dumps and stockpiles). Infrastructure with a physical size/ height that create a Visual Intrusion in the landscape - highly visible from close, medium and long- range views. Activities that shape landforms (stockpiles and dumps) that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Restrict the extent of visible dust migration. Manage Landshaping Activities. Manage Good Housekeeping.	Implement Dust Suppression according to the Dust Suppression Protocol. Implement the Shaping of Landforms according to Landform Shaping Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape. Final Vegetative Cover to present similar to the surrounding landscape.				
Stonedust Dump	Simunye Shaft Complex	Visibility. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Elements that generate Windblown Dust (dumps and stockpiles). Infrastructure with a physical size/ height as to create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Restrict the extent of visible dust migration. Manage Good Housekeeping.	Implement Dust Suppression according to the Dust Suppression Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.				



	OPERATIONAL PHASE - VISUALS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Potable Water Supply System (Pipelines)	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Potable Water Reservoir	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Service Water Dam (Top)	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size or height as to create a Visual Intrusion in the landscape. Thus, these elements are highly visible from close, medium and long- range views. Mining Activities that are subject to shaping of landforms. These activities include for instance stockpiles and dumps that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Manage Landshaping Activities. Manage Good Housekeeping.	Implement the Shaping of Landforms according to Landform Shaping Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape.			



OPERATIONAL PHASE - VISUALS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Service Water Dam (Bottom)	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size or height as to create a Visual Intrusion in the landscape. Thus, these elements are highly visible from close, medium and long- range views. Mining Activities that are subject to shaping of landforms. These activities include for instance stockpiles and dumps that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Manage Landshaping Activities. Manage Good Housekeeping.	Implement the Shaping of Landforms according to Landform Shaping Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape.			
Service Water Reticulation System (Pipelines)	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Storm Water Berms and Canals	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography).	Infrastructure that has a physical size/ height as to create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Landshaping Activities. Manage Good Housekeeping.	Implement the Shaping of Landforms according to Landform Shaping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape.			



	OPERATIONAL PHASE - VISUALS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
		Alterations to Landscape Morphology (Vegetation and Land Cover).	Activities that are subject to shaping of landforms (stockpiles and dumps) that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.		Implement Good Housekeeping according to the Housekeeping Protocol.			Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape. Final Vegetative Cover to present similar to the surrounding landscape.			
Sewage Treatment Plant	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Storage Yard (Temporary storage of general, domestic and industrial waste)	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
Storage Yard (Temporary storage of hazardous waste)	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			



	OPERATIONAL PHASE - VISUALS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
	PROPOSED ACTIVITIES										
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Lone-range views.			
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Vegetation and Land Cover).	Infrastructure that has a physical size/ height that create a Visual Intrusion in the landscape. Thus, highly visible from close, medium and long- range views.	Manage Good Housekeeping.	Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Operational Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views.			


5.3 Decommissioning Phase

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	DECOMMISSIONING PHASE - SOCIO-ECONOMIC/ CULTURAL											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Mitigation Type (Management Management Measures ojective/ Outcome)		Timeframe for Implementation	Standard to be achieved				
				SH	ONDONI SHAFT COMPLEX							
	Ob and and		Nutres	Mitigate the potential negative contribution	Keep an up to date the grievance register		Thursday	Zero incidents reported				
operation	Colliery	Aspects	factors	of the project towards nuisance factors: dust, noise etc.	Strictly adhere to noise/ air quality management plan	standards	decommissioning	through the stakeholder forum				
			Job and		Develop mechanisms to assist employees, prior to the retrenchment date in the transition phase and after closure of the operations	Social and Labour Plans as per the		Standard to be achieved Zero incidents reported through the stakeholder forum As per SLP/final closure plan				
Whole operation	Shondoni Colliery	Socio-Economic Aspects	income losses	Mitigate against job losses during closure	Focus on supporting non-core local supply links in procurement strategies as well as potential local enterprise development programmes during the operational phases of the mine to facilitate easier transitioning of local suppliers to other customers	Mineral and Petroleum Resources Development Act (Act 28 of 2002)	One year before closure	SLP/final closure plan				
Whole	Shondoni Colliery	Socio-Economic	Termination of social	Mitigate against negative impacts of terminating LED	Within the SLP focus on community support programmes with that build local capacity and sustainability in the local community	Social and Labour Plans as per the Regulation 46 of the Mineral and Petroleum	One year before	As per SLP/final				
operation	contery		funds	projects	Plan projects with an exit strategy of which beneficiaries are aware off	Resources Development Act (Act 28 of 2002)	chosure -	closure plan				



	DECOMMISSIONING PHASE - ARCHAEOLOGICAL/ HERITAGE / PALAEONTOLOGY											
Project Activity	Location	Environmen tal Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				SHONDONI SHAFT CO	OMPLEX							
Underground Mining	Shondoni Shaft Complex	Heritage Aspects	Potential Subsidence Impact on Graves	Remedy with reactive response on I&AP complaints	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons				
Underground Mining	Shondoni Shaft Complex	Heritage Aspects	Potential Subsidence Impact on Historical Remains	Remedy with reactive response on l&AP complaints	Documenting historical remains: Plan profile drawings, photographing and description	SAHRA Requirements (Approval/ Destruction Permit)	Documentation Process (4 months)	Positive community liaisons				
				SIMUNYE SHAFT CO	MPLEX							
Underground Mining	Simunye Shaft Complex	Heritage Aspects	Potential Subsidence Impact on Graves	Remedy with reactive response on I&AP complaints	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons				
Underground Mining	Shondoni Shaft Complex	Heritage Aspects	Potential Subsidence Impact on Historical Remains	Remedy with reactive response on I&AP complaints	Documenting historical remains: Plan profile drawings, photographing and description	SAHRA Requirements (Approval/ Destruction Permit)	Documentation Process (4 months)	Positive community liaisons				
				PROPOSED ACTIV	ITIES							
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Heritage Aspects	Potential Subsidence Impact on Graves	Remedy with reactive response on I&AP complaints	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons				
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Heritage Aspects	Potential Subsidence Impact on Historical Remains	Remedy with reactive response on l&AP complaints	Documenting historical remains: Plan profile drawings, photographing and description	SAHRA Requirements (Approval/ Destruction Permit)	Documentation Process (4 months)	Positive community liaisons				
Proposed Ventilation	Shondoni	Palaeontolog	Unlikely exposure of	Remedy by assessing the fossils before further decommissioning activity takes place so that the	Qualified palaeontologist to assess fossils	SAHRA Requirements	During decommissioning activities	Restrict impact to development footprint.				
Shafts	Colliery	ical Fossils	plant fossils	necessary rescue operations can be implemented by a qualified palaeontologist	Qualified palaeontologist to implement chance find procedure	SAHRA Requirements	During decommissioning activities	Restrict impact to development footprint				

Table 5.3(b): Decommissioning Phase Impact Management Measures Table - Archaeological/ Heritage / Palaeontology



DECOMMISSIONING PHASE - TOPOGRAPHY										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
				SHONDONI SHA	AFT COMPLEX					
					Surface stones/boulders and remnants must be buried					
			Creation of		Backfill deep voids/depressions					
Shondoni Shaft	Shondoni	Topography:	unstable/ dangerous	Remedy by reshaping and	Reshape disturbed areas and flatten steep slopes	Final Rehabilitation,	Decommissioning	Shaft areas to be free-		
Complex	Complex	Morphology	due to	revegetating disturbed areas	Even out all rough surfaces	Decommissioning and Closure Plan	Phase	Standard to be achieved Image: Shaft areas to be free- draining. No ponding. Image: Subsided areas to be free- draining. No ponding. Image: Subsided areas to be free- draining. No ponding. Image: Shaft areas to be free- draining. No ponding. Image: Shaft areas to be free- draining. No ponding.		
			activities		Ensure surface is free-draining					
				Re-vegetate						
					Detailed topographical survey every 5 years	MHSA Regulations Section 17				
Underground	Shondoni	Topography:	Areas prone to surface subsidence	Remedy areas where	Provide an I&AP grievance register and investigate registered complaints	SHE Manual	Decommissioning	Standard to be achieved Shaft areas to be free- draining. No ponding. Subsided areas to be free- draining. No ponding. Subsided areas to be free- draining. No 		
Mining	Snart Complex	Stability	as a result of underground mining	subsidence has occurred	Ensure ground surface where subsidence has occurred is made free-draining	Best Practice Guidelines with regards to maximising clean water runoff	Phase	draining. No ponding.		
				SIMUNYE SHA	FT COMPLEX					
					Surface stones/boulders and remnants must be buried					
			Creation of		Backfill deep voids/depressions			Shaft areas to be free- draining. No ponding. Subsided areas to be free- draining. No ponding.		
Simunye Shaft	Simunye	Topography:	unstable/ dangerous	Remedy by reshaping and	Reshape disturbed areas and flatten steep slopes	Final Rehabilitation,	Decommissioning	Shaft areas to be free-		
Complex	Complex	Morphology	due to	revegetating disturbed areas	Even out all rough surfaces	Decommissioning and Closure Plan	Phase	draining. No ponding.		
			activities		Ensure surface is free-draining					
					Re-vegetate					

Table 5.3(c): Decommissioning Phase Impact Management Measures Table – Topography



	DECOMMISSIONING PHASE - TOPOGRAPHY											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
			Areas prope to		Detailed topographical survey every 5 years Provide an I&AP grievance register	MHSA Regulations Section 17	_					
Underground	Simunye	Topography:	bography: surface subsidence as a result of	Remedy areas where	and investigate registered complaints	SHE Manual	Decommissioning	Subsided areas to be free-				
Mining	Complex	Stability	underground mining	occurred	Ensure ground surface where subsidence has occurred is made free-draining	Best Practice Guidelines with regards to maximising clean water runoff	Phase	draining. No ponding.				
PROPOSED ACTIVITIES												
					Detailed topographical survey every 5 years	MHSA Regulations Section 17						
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Topography: Stability	Areas prone to surface subsidence as a result of underground mining	Remedy areas where subsidence has occurred	Provide an I&AP grievance register and investigate registered complaints	SHE Manual	Decommissioning Phase	Subsided areas to be free- draining. No ponding.				
					Ensure ground surface where subsidence has occurred is made free-draining	Best Practice Guidelines with regards to maximising clean water runoff						
					Surface stones/boulders and remnants must be buried							
			Creation of		Backfill deep voids/depressions							
Ventilation	Shondoni	Topography:	dangerous excavations/dumps	Remedy by reshaping and	Reshape disturbed areas and flatten steep slopes	Final Rehabilitation,	Decommissioning	Shaft areas to be free-				
Shafts	Colliery	Morphology	due to decommissioning	revegetating disturbed areas	Even out all rough surfaces	Even out all rough surfaces Decommissioning and Closure Plan Phase Ensure surface is free-draining Phase Phase	Phase	draining. No ponding.				
			activities		Ensure surface is free-draining							
					Re-vegetate							



	DECOMMISSIONING PHASE – SOILS, LAND CAPABILITY & LAND USE											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				SHONDONI SHAFT CC	MPLEX							
Access Roads	Shondoni Shaft Complex	Rehabilitation of impacted footprint- Consider soil replacement (horizon order) and morphology (topographic landscaping), soil fertility and residual contamination (dirty water runoff). Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				
Security Fence and Access	Shondoni Shaft Complex	Rehabilitation of impacted footprint- Consider soil replacement (horizon order) and morphology (topographic landscaping), soil fertility and residual contamination. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				

Table 5.3(d): Decommissioning Phase Impact Management Measures Table – Soils, Land Capability & Land Use



	DECOMMISSIONING PHASE – SOILS, LAND CAPABILITY & LAND USE											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Offices, Workshops and Change houses	Shondoni Shaft Complex	Rehabilitation of impacted footprint- Consider soil replacement (horizon order) and morphology (topographic landscaping), soil fertility and residual contamination (hydrocarbons, reagents, silt etc.). Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				
Internal Roads and Parking Areas	Shondoni Shaft Complex	Rehabilitation of impacted footprint- Consider soil replacement (horizon order) and morphology (topographic landscaping to free drainage), soil fertility and residual contamination. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				



			DECOMMISSIO	NING PHASE – SOILS, LAN	D CAPABILITY & LAND USE			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Electricity Supply	Shondoni Shaft Complex	Rehabilitation of impacted footprint (linear) - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Fuel & Oil Storage	Shondoni Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination from fuel/oil storage. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Explosives Off- Load Area	Shondoni Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination from explosive reagents. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Man and Material Shaft Infrastructure	Shondoni Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Conveyor System	Shondoni Shaft Complex	Rehabilitation of impacted footprint (linear) - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Ventilation Shaft	Shondoni Shaft Complex	Rehabilitation of impacted footprint - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Underground Mining	Shondoni Shaft Complex	Decommissioning - Rehab of impacted footprint areas (subsidence and ponding), replacement of soils (horizon order) and landscaping (morphology) of areas to be free draining (Backfilling of subsidence and rectification of ponded areas). Reinstatement of land capability status and beneficial land use.	Loss of soil utilisation potential, salinisation and/or contamination by dirty water ingress and/or used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Complete mining, replace soils on areas of subsidence and landscape to free draining, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				
Topsoil/ Overburden Stockpile	Shondoni Shaft Complex	Decommissioning - replacement of soils (horizon order), rehabilitation of impacted footprint (stockpile pad) and landscaping (morphology) to be free draining. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Complete Operations, replace soils and landscape to free draining, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Coal Storage in Surface Bunker	Shondoni Shaft Complex	Rehabilitation of impacted footprint- Consider soil replacement (horizon order) and morphology (topographic landscaping to free drainage), soil fertility and residual contamination. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Coal Stockpile and Throw- Out Area	Shondoni Shaft Complex	Rehabilitation of impacted footprint- Consider soil replacement (horizon order) and morphology (topographic landscaping to free drainage), soil fertility and residual contamination. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Stonedust Dump	Shondoni Shaft Complex	Rehabilitation of impacted footprint- Consider soil replacement (horizon order) and morphology (topographic landscaping to free drainage), soil fertility and residual contamination. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Potable Water Supply System (Pipelines)	Shondoni Shaft Complex	Rehabilitation of impacted footprint (linear) - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination (dirty water runoff - silt and soil). Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Potable Water Reservoir	Shondoni Shaft Complex	Rehabilitation of impacted footprint - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination (dirty water runoff - silt and soil). Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Shondoni PCD	Shondoni Shaft Complex	Rehabilitation of impacted footprint - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination (dirty water runoff and ingress from PCD). Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Shondoni Incline PCD	Shondoni Shaft Complex	Rehabilitation of impacted footprint - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination (dirty water runoff and ingress from PCD). Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Surface Service Water Reservoir	Shondoni Shaft Complex	Rehabilitation of impacted footprint - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination (dirty water runoff - silt and soil). Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Service Water Reticulation System (Pipelines)	Shondoni Shaft Complex	Rehabilitation of impacted footprint (linear) - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination (dirty water - silt and soil). Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.			
Storm Water Berms and Canals	Shondoni Shaft Complex	Rehabilitation of impacted footprint - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination (dirty water - silt and soil). Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Complete Operations, replace soils and landscape to free draining, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.			



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Attenuation Dam/ Structure	Shondoni Shaft Complex	Rehabilitation of impacted footprint - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination (dirty water runoff - silt and soil). Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.			
Oil and Silt Traps	Shondoni Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - Consider soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination from Oil and Silt management. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.			



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Sewage Treatment Plant	Shondoni Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - Soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination from Sewage drying pads. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Iso Yard (Temporary storage of general, domestic and industrial waste)	Shondoni Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - Soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination from Iso Yard. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



	DECOMMISSIONING PHASE – SOILS, LAND CAPABILITY & LAND USE										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Iso Yard (Temporary storage of hazardous waste)	Shondoni Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - Soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination from Iso Yard. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.			
Capital Yard (Temporary storage of scrap metal)	Shondoni Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - Soil replacement (horizon order) and morphology (topographic landscaping - free drainage), soil fertility and residual contamination from Iso Yard. Reinstatement of land capability status and beneficial land use.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.			



	DECOMMISSIONING PHASE - SOILS, LAND CAPABILITY & LAND USE										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
				SIMUNYE SHAFT CO	MPLEX						
Access Roads	Simunye Shaft Complex	Rehabilitation of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.			
Security Fence and Access	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.			



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Offices, Workshops and Change houses	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.			
Internal Roads and Parking Areas	Simunye Shaft Complex	Rehabilitation of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.			



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Electricity Supply	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Fuel Storage	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Man and Material Shaft Infrastructure	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Ventilation Shaft	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Underground Mining	Simunye Shaft Complex	Decommissioning, rehab of impacted footprint area (subsidence and ponding), replacement of soils and landscaping of areas to be free draining, movement of rehab vehicles over unprotected soils and irrigation of re-vegetated areas where possible.	Loss of soil utilisation potential, salinisation and/or contamination by dirty water ingress and/or used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Complete mining, replace soils on areas of subsidence and landscape to free draining, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Topsoil/ Overburden Stockpile	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Complete Operations, replace soils and landscape to free draining, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Stonedust Dump	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Potable Water Supply System (Pipelines)	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Potable Water Reservoir	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Service Water Dam (Top)	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Service Water Dam (Bottom)	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Service Water Reticulation System (Pipelines)	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Storm Water Berms and Canals	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Complete Operations, replace soils and landscape to free draining, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.
Sewage Treatment Plant	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.



	DECOMMISSIONING PHASE - SOILS, LAND CAPABILITY & LAND USE											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Storage Yard (Temporary storage of general, domestic and industrial waste)	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				
Storage Yard (Temporary storage of hazardous waste)	Simunye Shaft Complex	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				



	DECOMMISSIONING PHASE – SOILS, LAND CAPABILITY & LAND USE											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				PROPOSED ACTIVI	TIES							
Underground Mining (Block 8 North)	Shondoni Colliery - Block 8 North Reserve	Decommissioning, rehab of impacted footprint area (subsidence and ponding), replacement of soils and landscaping of areas to be free draining, movement of rehab vehicles over unprotected soils and irrigation of re-vegetated areas where possible.	Loss of soil utilisation potential, salinisation and/or contamination by dirty water ingress and/or used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Decommissioning and cessation of mining. Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Complete mining, replace soils on areas of subsidence and landscape to free draining, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				



	DECOMMISSIONING PHASE - SOILS, LAND CAPABILITY & LAND USE											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				



	DECOMMISSIONING PHASE - SOILS, LAND CAPABILITY & LAND USE										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Decommissioning, removal and rehab of impacted footprint area - replacement of soils, movement of rehabilitation vehicles over unprotected soils and irrigation of re- vegetated areas where possible.	Loss of soil nutrients while soils in storage, contamination by dirty water used for watering of rehabilitated/re- vegetated areas, possible hydrocarbon spills from rehab vehicles and decommissioned infrastructure, compaction & dust. Positive mitigation = reduction in area of impact.	Manage and return area to as close as possible it's original condition. Monitor erosion, compaction, soil fertility/remediation success/failure and rectify where necessary. Manage movement of people, animals and traffic over rehabilitated land.	Remove Infrastructure/facility, replace soils, add nutrients (fertilizer and Lime as required - Lab Analysis), maintain stormwater controls and channel dirty water to PCD, maintain vehicles in good working order - reduce contamination.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil utilisation plan for footprint of disturbance, including stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Post Mining and Processing, but Pre Closure	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.			



DECOMMISSIONING PHASE - GEOLOGY											
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
	SHONDONI SHAFT COMPLEX										
Underground Mining	Shondoni Shaft Complex	Geology: Lithology	Changes in overlying lithology due to potential pillar/roof failure within the underground workings	Control indirect impacts by identifying surface deformation areas	Survey department to update and provide draft / GIS department with detailed layouts of any deformation and subsidence on surface of roof and pillar failures	MHSA Regulations Section 17	Every three years	Detailed delineation of any surface deformations			
	SIMUNYE SHAFT COMPLEX										
Underground Mining	Simunye Shaft Complex	Geology: Lithology	Changes in overlying lithology due to potential pillar/roof failure within the underground workings	Control indirect impacts by identifying surface deformation areas	Survey department to update and provide draft / GIS department with detailed layouts of any deformation and subsidence on surface of roof and pillar failures	MHSA Regulations Section 17	Every three years	Detailed delineation of any surface deformations			
			I	PROPOSED ACTIVITIE	S						
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Geology: Lithology	Changes in overlying lithology due to potential pillar/roof failure within the underground workings	Control indirect impacts by identifying surface deformation areas	Survey department to update and provide draft / GIS department with detailed layouts of any deformation and subsidence on surface of roof and pillar failures	MHSA Regulations Section 17	Every three years	Detailed delineation of any surface deformations			

Table 5.3(e): Decommissioning Phase Impact Management Measures Table – Geology



	DECOMMISSIONING PHASE - GROUNDWATER											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				SHONDONI SHAFT CO	MPLEX							
Fuel & Oil Storage	Shondoni Shaft Complex	Groundwater quality	The decommissioning of diesel fuel storage tanks can lead to residual groundwater pollution.	Ensure that the diesel tanks and associated infrastructure is empty when decommissioning, to prevent the leakage of any diesel spill away from the bunker footprint.	All residual spillages must be captured inside the footprint areas before any spillage to the surrounding environment takes place.	Best Practise Guidelines with regards to containing dirty water runoff	During the decommissioning phase	Groundwater quality to be complaint with resource quality objectives				
Man and Material Shaft Infrastructure	Shondoni Shaft Complex	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre-mining groundwater levels.	The return of groundwater levels to pre-mining levels is a positive impact.	Monitor underground groundwater level on a quarterly basis.	Approved Mine Closure Plan	During the decommissioning phase	Final decommissioned groundwater levels				
Ventilation Shaft	Shondoni Shaft Complex	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre-mining groundwater levels.	The return of groundwater levels to pre-mining levels is a positive impact.	Monitor underground groundwater level on a quarterly basis.	Approved Mine Closure Plan	During the decommissioning phase	Final decommissioned groundwater levels				
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	The continuous influx of groundwater recharge into mine workings due to bord and pillar mining.	Manage the influx of normal groundwater recharge as part of the closure phase water balance.	Manage the post-closure phase water balance responsibly to reduce water make and optimise underground storage space available, until all mining units are flooded.	Approved Mine Closure Plan	During the decommissioning phase	Groundwater quality to be complaint with resource quality objectives				

Table 5.3(f): Decommissioning Phase Impact Management Measures Table - Groundwater



			DE	COMMISSIONING PHASE - G	ROUNDWATER			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	Groundwater recharge due to operational phase mining activities will continue during the decommissioning phase. The impact will persist well beyond the post- closure phase.	Manage the influx of normal groundwater recharge as part of the closure phase water balance.	Manage the post-closure phase water balance responsibly to reduce water make and optimise underground storage space available, until all mining units are flooded.	Approved Mine Closure Plan	During the decommissioning phase	Groundwater quality to be complaint with resource quality objectives
Coal Stockpile and Throw-Out Area	Shondoni Shaft Complex	Groundwater quality	The decommissioning of the Coal Stockpile and Throw-Out Area. Residual seepage from the footprint area can lead to further groundwater pollution.	To prevent the residual seepage of contaminated soils from the ROM stockpile entering the underlying aquifer units.	The footprint must be rehabilitated to pre- mining surface- and topographical conditions.	Shondoni EMP	During the decommissioning phase	Groundwater quality to be complaint with resource quality objectives
Shondoni PCD	Shondoni Shaft Complex	Groundwater quantity and quality	Decommissioning of the Shondoni PCD.	To prevent the residual seepage of contaminated water from the Storm Water Pollution Control Dam (SWPCD) footprint entering the underlying aquifer units.	Prevent residual seepages and spillages of polluted water from the SWPCD footprint by rehabilitating the	Shondoni EMP	During the decommissioning phase	Groundwater quality to be complaint with resource quality objectives
Shondoni Incline PCD	Shondoni Shaft Complex	Groundwater quantity and quality	Decommissioning of the Shondoni Incline PCD.	To prevent the residual seepage of contaminated water from the Shondoni Incline PCD footprint entering the underlying aquifer units.	surface area to pre- mining surface- and topographical conditions. Shondoni EMP decommissioning phase	Groundwater quality to be complaint with resource quality objectives		



DECOMMISSIONING PHASE - GROUNDWATER										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
Oil and Silt Traps	Shondoni Shaft Complex	Groundwater quantity and quality	The Attenuation Dam/ Structure will have insignificant impact on groundwater, this part of the overall water measures implemented.	Ensure that the Oil and Silt Traps and associated infrastructure is empty when decommissioning, to prevent the spillage of any oils away from the footprint.	All residual spillages must be captured inside the footprint areas before any spillage to the surrounding environment takes place.	Best Practise Guidelines with regards to containing dirty water runoff	During the decommissioning phase	Groundwater quality to be complaint with resource quality objectives		
SIMUNYE SHAFT COMPLEX										
Offices, Workshops and Changehouses	Simunye Shaft Complex	Groundwater quantity and quality	Insignificant impact on groundwater due to relative small area / measures implemented.	Control by maintaining the implemented integrated water management plan to separate clean and dirty water	Intercept and contain dirty water as per the water management plan.	Best Practise Guidelines with regards to containing dirty water runoff	During the operational phase	Groundwater quality to be complaint with resource quality objectives		
Fuel Storage	Simunye Shaft Complex	Groundwater quality	The decommissioning of diesel fuel storage tanks can lead to residual groundwater pollution.	Ensure that the diesel tanks and associated infrastructure is empty when decommissioning, to prevent the leakage of any diesel spill away from the bunker footprint.	All residual spillages must be captured inside the footprint areas before any spillage to the surrounding environment takes place.	Best Practise Guidelines with regards to containing dirty water runoff	During the decommissioning phase	Groundwater quality to be complaint with resource quality objectives		
Man and Material Shaft Infrastructure	Simunye Shaft Complex	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre-mining groundwater levels.	The return of groundwater levels to pre-mining levels is a positive impact.	Monitor underground groundwater level on a quarterly basis.	Approved Mine Closure Plan	During the decommissioning phase	Final decommissioned groundwater levels		



DECOMMISSIONING PHASE - GROUNDWATER								
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Ventilation Shaft	Simunye Shaft Complex	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre-mining groundwater levels.	The return of groundwater levels to pre-mining levels is a positive impact.	Monitor underground groundwater level on a quarterly basis.	Approved Mine Closure Plan	During the decommissioning phase	Final decommissioned groundwater levels
Underground Mining	Simunye Shaft Complex	Groundwater quantity and quality	The continuous influx of groundwater recharge into mine workings due to bord and pillar mining.	Manage the influx of normal groundwater recharge as part of the closure phase water balance.	Manage the post-closure phase water balance responsibly to reduce water make and optimise underground storage space available, until all mining units are flooded	Approved Mine Closure Plan	During the decommissioning phase	Groundwater quality to be complaint with resource quality objectives
Service Water Dam (Top)	Simunye Shaft Complex	Groundwater quantity and quality	Decommissioning of the Service Water Dam (Top).	To prevent the residual seepage of contaminated water from the Service Water Dam (Top) footprint entering the underlying aquifer units.	Prevent residual seepages and spillages of polluted water from the Service Water Dam (Top) footprint by rehabilitating the surface area to pre- mining surface- and topographical conditions.	Shondoni EMP	During the decommissioning phase	Groundwater quality to be complaint with resource quality objectives


			DEG	COMMISSIONING PHASE - G	ROUNDWATER			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Service Water Dam (Bottom)	Simunye Shaft Complex	Groundwater quantity and quality	Decommissioning of the Service Water Dam (Bottom).	To prevent the residual seepage of contaminated water from the Service Water Dam (Bottom)) footprint entering the underlying aquifer units.	Prevent residual seepages and spillages of polluted water from the Service Water Dam (Bottom) footprint by rehabilitating the surface area to pre- mining surface- and topographical conditions.	Shondoni EMP	During the decommissioning phase	Groundwater quality to be complaint with resource quality objectives
Sewage Treatment Plant	Simunye Shaft Complex	Groundwater quantity and quality	The Attenuation Dam/ Structure will have insignificant impact on groundwater, this part of the overall water measures implemented.	Ensure that the Oil and Silt Traps and associated infrastructure is empty when decommissioning, to prevent the spillage of any oils away from the footprint.	All residual spillages must be captured inside the footprint areas before any spillage to the surrounding environment takes place.	Best Practise Guidelines with regards to containing dirty water runoff	During the decommissioning phase	Groundwater quality to be complaint with resource quality objectives
	•			PROPOSED ACTIVIT	TIES	•	•	
Underground Mining (Block 8 North)	Shondoni Colliery - Block 8 North Reserve	Groundwater quantity and quality	The continuous influx of groundwater recharge into mine workings due to bord and pillar mining.	Manage the influx of normal groundwater recharge as part of the closure phase water balance.	Manage the post-closure phase water balance responsibly to reduce water make and optimise underground storage space available, until all mining units are flooded	Approved Mine Closure Plan	During the decommissioning phase	Groundwater quality to be complaint with resource quality objectives
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre-mining groundwater levels.	The return of groundwater levels to pre-mining levels is a positive impact.	Monitor underground groundwater level on a quarterly basis.	Approved Mine Closure Plan	During the decommissioning phase	Final decommissioned groundwater levels



			DEC	COMMISSIONING PHASE - G	ROUNDWATER			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre-mining groundwater levels.	The return of groundwater levels to pre-mining levels is a positive impact.	Monitor underground groundwater level on a quarterly basis.	Approved Mine Closure Plan	During the decommissioning phase	Final decommissioned groundwater levels
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre-mining groundwater levels.	The return of groundwater levels to pre-mining levels is a positive impact.	Monitor underground groundwater level on a quarterly basis.	Approved Mine Closure Plan	During the decommissioning phase	Final decommissioned groundwater levels
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre-mining groundwater levels.	The return of groundwater levels to pre-mining levels is a positive impact.	Monitor underground groundwater level on a quarterly basis.	Approved Mine Closure Plan	During the decommissioning phase	Final decommissioned groundwater levels



			DECOMMISSIONIN	IG PHASE – SURFACE V	VATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
			SHONDO	NI SHAFT COMPLEX				
Access Roads	Shondoni Shaft Complex	Surface Water quality	Remove Concrete/Paving, Level Surface to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Security Fence and Access	Shondoni Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Offices, Workshops and Changehouses	Shondoni Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Internal Roads and Parking Areas	Shondoni Shaft Complex	Surface Water quality	Remove Concrete/Paving, Level Surface to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives

Table 5.3(g): Decommissioning Phase Impact Management Measures Table – Surface Water



			DECOMMISSIONIN	IG PHASE – SURFACE V	VATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Electricity Supply	Shondoni Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Fuel & Oil Storage	Shondoni Shaft Complex	Surface Water quality	Remove Fuel/Oil & Infrastructure, Remove Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Explosives Off- Load Area	Shondoni Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Man and Material Shaft Infrastructure	Shondoni Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives



			DECOMMISSIONIN	G PHASE – SURFACE W	ATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Conveyor System	Shondoni Shaft Complex	Surface Water quality	Remove any Excess Coal, Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Ventilation Shaft	Shondoni Shaft Complex	Surface Water quality	Remove Infrastructure & Foundations, Backfill, Cap with concrete slab, Level Surface to be Free-Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Coal Storage in Surface Bunker	Shondoni Shaft Complex	Surface Water quality	Remove any Excess Coal, Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Coal Stockpile and Throw-Out Area	Shondoni Shaft Complex	Surface Water quality	Remove any Excess Coal, Level Surface to be Free-Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives



			DECOMMISSIONIN	IG PHASE – SURFACE W	VATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Potable Water Reservoir	Shondoni Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Shondoni PCD	Shondoni Shaft Complex	Surface Water quality	Dewatering of Dam, Removal of sediment, Liner and underlying layers, Flatten and Shape Dam Walls, Resoil, Fertilize, Re- Vegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Shondoni Incline PCD	Shondoni Shaft Complex	Surface Water quality	Dewatering of Dam, Removal of sediment, Liner and underlying layers, Flatten and Shape Dam Walls, Resoil, Fertilize, Re- Vegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Surface Service Water Reservoir	Shondoni Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives



			DECOMMISSIONIN	IG PHASE – SURFACE W	VATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Attenuation Dam/ Structure	Shondoni Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Oil and Silt Traps	Shondoni Shaft Complex	Surface Water quality	Remove Oil/ Silt, Remove Infrastructure, Backfill Traps, Level Surface to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Sewage Treatment Plant	Shondoni Shaft Complex	Surface Water quality	Waste Classification and Removal, Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Iso Yard (Temporary storage of general, domestic and industrial waste)	Shondoni Shaft Complex	Surface Water quality	Remove Waste and Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives



			DECOMMISSIONIN	IG PHASE – SURFACE W	VATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Iso Yard (Temporary storage of hazardous waste)	Shondoni Shaft Complex	Surface Water quality	Remove Waste and Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Capital Yard (Temporary storage of scrap metal)	Shondoni Shaft Complex	Surface Water quality	Remove Scrap Metal and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
			SIMUNY	E SHAFT COMPLEX				
Access Roads	Simunye Shaft Complex	Surface Water quality	Remove Concrete/Paving, Level Surface to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Security Fence and Access	Simunye Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives



			DECOMMISSIONIN	IG PHASE – SURFACE W	VATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Offices, Workshops and Changehouses	Simunye Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Internal Roads and Parking Areas	Simunye Shaft Complex	Surface Water quality	Remove Concrete/Paving, Level Surface to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Electricity Supply	Simunye Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Fuel Storage	Simunye Shaft Complex	Surface Water quality	Remove Fuel/Oil and Infrastructure, Remove Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives



			DECOMMISSIONIN	IG PHASE – SURFACE W	VATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Man and Material Shaft Infrastructure	Simunye Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Ventilation Shaft	Simunye Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill, Cap with concrete slab, Level Surface to be Free-Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Potable Water Reservoir	Simunye Shaft Complex	Surface Water quality	Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Service Water Dam (Top)	Simunye Shaft Complex	Surface Water quality	Dewatering of Dam, Removal of sediment, Liner and underlying layers, Flatten and Shape Dam Walls, Resoil, Fertilize, Re- Vegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives



			DECOMMISSIONIN	IG PHASE – SURFACE W	VATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Service Water Dam (Bottom)	Simunye Shaft Complex	Surface Water quality	Dewatering of Dam, Removal of sediment, Liner and underlying layers, Flatten and Shape Dam Walls, Resoil, Fertilize, Re- Vegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Sewage Treatment Plant	Simunye Shaft Complex	Surface Water quality	Waste Classification and Removal, Remove Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Storage Yard (Temporary storage of general, domestic and industrial waste)	Simunye Shaft Complex	Surface Water quality	Remove Waste and Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
Storage Yard (Temporary storage of hazardous waste)	Simunye Shaft Complex	Surface Water quality	Remove Waste and Infrastructure and Foundations, Backfill and Level Excavations to be Free- Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives



			DECOMMISSIONIN	G PHASE – SURFACE W	VATER			
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
			PROPO	SED ACTIVITIES				
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Surface Water quality	Remove Infrastructure and Foundations, Backfill, Cap with concrete slab, Level Surface to be Free-Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Surface Water quality	Remove Infrastructure and Foundations, Backfill, Cap with concrete slab, Level Surface to be Free-Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Surface Water quality	Remove Infrastructure and Foundations, Backfill, Cap with concrete slab, Level Surface to be Free-Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Surface Water quality	Remove Infrastructure and Foundations, Backfill, Cap with concrete slab, Level Surface to be Free-Draining, Resoil, Fertilize, Revegetate. Impact on water quality due to potential increase in suspended solids in surface water runoff from the site.	Enhance by installation of silt barriers in streams prone to serious erosion	Monitor efficiency of silt barriers	Best Practice Guidelines with regards to silt loads in surface water runoff	Prior to commencement of activity	Surface water quality to be compliant with resource quality objectives



DECOMMISSIONING PHASE – PLANT LIFE (FLORA)											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
SHONDONI SHAFT COMPLEX											
		All areas of	Establishment of	Minimisation - alien plant	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species.	NEMBA (10/2004);	Decommissioning	No established populations of			
	Shondoni	Natural Habitat crossed by Access Roads	populations of invasive alien plant species	eradication and management	Quarterly inspections of the road verges, focussing on areas of bare soil where alien plants get established.	Alien and Invasive Species Regulations, 2014	and Post Closure Phase	alien invasive species at the end of each			
Access Roads	Shaft				Control of any populations of invasive species by alien plant control team.	2011					
	Complex	411 6	Degradation of Natural Habitat	Minimisation -	Regular wetting of all dirt road surfaces during dry season (May – Nov).			No die-off vegetation			
		All areas of Natural Habitat	(listed Threatened	dust	No wetting of roads in wet season (Dec-Apr) except in years of low rainfall.	_	Decommissioning and Post Closure	along road verges as a			
		Access Roads	Ecosystem & CBAs) - excess dust production	production along access roads	Maximum speed of 40km/hr on all dirt roads.		Phase	result of excess dust production.			
					Topsoil to be returned from nearby stockpiles.			Restoration of 75% of species			
Security Fence and Access, Offices, Workshops and			Direct loss of Natural Habitat in a listed Threatened	Rehabilitation -restoration of original	Planting of a selection of indigenous grass species to stabilise topsoil and enable germination of other species represented in the topsoil seedbed.	NEMBA (10/2004)	Decommissioning and Post Closure Phase	richness & diversity of original natural habitat			
Changehouses, Internal Roads and Parking			Ecosystem	naturar nabitat	Annual audits of species richness and diversity of indigenous species.			(as determined by sample sites nearby).			
and Parking Areas, Man and Material Shaft Infrastructure, Ventilation Shaft, Potable Water Reservoir, Attenuation Dam/ Structure, Storm Water Berms and Canals	Shondoni Shaft Complex	Habitats at sites being decommissioned	Establishment of populations of invasive alien	Minimisation - alien plant eradication	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species.	NEMBA (10/2004); Alien and Invasive Species	Decommissioning and Post Closure	No established populations of alien invasive species at the			
			plant species	management	Quarterly inspections of areas of bare soil, adjacent to infrastructure where alien plants get established.	Regulations, 2014	Filase	end of each annual audit.			
					by alien plant control team.						

Table 5.3(h): Decommissioning Phase Impact Management Measures Table – Plant Life (Flora)



	DECOMMISSIONING PHASE – PLANT LIFE (FLORA)											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Fuel & Oil Storage, Explosives Off- Load Area, Coal storage in Surface Bunker, Coal Stockpile and Throw-Out Area, Stomedust Dump, Shondoni PCD, Shondoni Incline PCD, Surface Service Water Reservoir, Capital Yard (Temporary storage of scrap metal), Iso			Direct loss of Natural Habitat in a listed Threatened Ecosystem (including CBAs)	Rehabilitation - restoration of original natural habitat	Topsoil to be returned from nearby stockpiles. Planting of a selection of indigenous grass species to stabilise topsoil and enable germination of other species represented in the topsoil seedbed. Annual audits of species richness and diversity of indigenous species.	NEMBA (10/2004)	Decommissioning and Post Closure Phase	Restoration of 75% of species richness and diversity of original natural habitat (as determined by sample sites nearby).				
	Shondoni Shaft Complex	i Habitats at sites being decommissioned	Establishment of	Minimisation - alien plant	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species.	NEMBA (10/2004); Alien and	Decommissioning	No established populations of alien invasive				
storage of hazardous waste and general,			invasive alien plant species	eradication and management	Quarterly inspections of areas of bare soil , adjacent to infrastructure where alien plants get established.	Invasive Species Regulations, 2014	Phase	Restoration of 75% of species richness and diversity of original natural habitat (as determined by sample sites nearby). No established populations of alien invasive species at the end of each annual audit. Restoration of 75% of species richness and diversity of original natural habitat (as determined by sample sites				
domestic and industrial waste), Sewage Treatment Plant, Oil and Silt Traps					Control of any populations of invasive species by alien plant control team.							
	Shondoni		Direct loss of		Topsoil to be returned from nearby stockpiles.			Restoration of 75% of species				
Conveyor System	Shaft Complex	Habitats at sites being decommissioned	Natural Habitat in a listed Threatened Ecosystem	Rehabilitation -restoration of original natural habitat	Planting of a selection of indigenous grass species to stabilise topsoil and enable germination of other species represented in the topsoil seedbed.	NEMBA (10/2004)	Decommissioning and Post Closure Phase	diversity of original natural habitat (as determined				
			(including CDAS)		Annual audits of species richness and diversity of indigenous species.			by sample sites nearby)				



DECOMMISSIONING PHASE – PLANT LIFE (FLORA)											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Conveyor System	Shondoni Shaft Complex	Habitats at sites being decommissioned	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species. Quarterly inspections of areas of bare soil, adjacent to infrastructure where alien plants get established. Control of any populations of invasive species by alien plant control team.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Decommissioning and Post Closure Phase	No established populations of alien invasive species at the end of each annual audit.			
Underground Mining	Shondoni Shaft Complex	Areas of Natural Habitat	Degradation of Natural Habitat (listed Threatened Ecosystem and CBAs) through potential subsidence	Minimisation - control of alien plants in areas of potential subsidence	Inspection of any reported areas of subsidence to ensure that no bare soils has been exposed. Quarterly inspections of areas of bare soil where plants can get established. Control of any populations of invasive species by alien plant control team.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Decommissioning and Post Closure Phase	No established populations of alien invasive species at the end of each annual audit.			
Potable Water Supply System (Pipelines),	Shondoni	Habitats at sites	Direct loss of Natural Habitat in a listed Threatened Ecosystem (including CBAs)	Rehabilitation - restoration of original natural habitat	Topsoil to be returned from nearby stockpiles. Planting of a selection of indigenous grass species to stabilise topsoil and enable germination of other species represented in the topsoil seedbed. Annual audits of species richness and diversity of indigenous species.	NEMBA (10/2004)	Decommissioning and Post Closure Phase	Restoration of 75% of species richness and diversity of original natural habitat (as determined by sample sites nearby).			
Service Water Reticulation System (Pipelines), Electricity Supply	Shaft Complex	loni Habitats at sites ft being decommissioned	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species. Quarterly inspections of areas of bare soil, adjacent to infrastructure where alien plants get established. Control of any populations of invasive species by alien plant control team.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Decommissioning and Post Closure Phase	No established populations of alien invasive species at the end of each annual audit.			



]	DECOMMISSIONI	NG PHASE – PLANT LIFE (FLORA)					
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
SIMUNYE SHAFT COMPLEX										
Access Roads	Simunye Shaft	All areas of Natural Habitat crossed by Access Roads	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species. Quarterly inspections of the road verges, focussing on areas of bare soil where alien plants get established. Control of any populations of invasive species	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Decommissioning and Post Closure Phase	No established populations of alien invasive species at the end of each annual audit.		
Access Roads	Shaft Complex	All areas of Natural Habitat crossed by Access Roads	Degradation of Natural Habitat (listed Threatened Ecosystem & CBAs) through excess dust production	Minimisation - reduction of dust production along access roads	by alien plant control team. Regular wetting of all dirt road surfaces during dry season (May – Nov). No wetting of roads in wet season (Dec-Apr) except in years of low rainfall. Maximum speed of 40km/hr on all dirt roads.	- <u>-</u>	Decommissioning and Post Closure Phase	No die-off vegetation along road verges as a result of excess dust production.		
Security Fence and Access, Offices, Workshops and Changehouses, Internal Roads and Parking Areas, Man and Material Shaft	Simunya	Habitate at citoe	Direct loss of Natural Habitat in a listed Threatened Ecosystem (including CBAs)	Rehabilitation -restoration of original natural habitat	Topsoil to be returned from nearby stockpiles. Planting of a selection of indigenous grass species to stabilise topsoil and enable germination of other species represented in the topsoil seedbed. Annual audits of species richness and diversity of indigenous species.	NEMBA (10/2004)	Decommissioning and Post Closure Phase	Restoration of 75% of species richness & diversity of original natural habitat (as determined by sample sites nearby).		
Infrastructure, Ventilation Shaft, Potable Water Reservoir, Attenuation Dam/ Structure, Storm Water Berms and Canals, Service Water Dam (Top & Bottom)	Simunye Shaft Complex	decommissioned	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species. Quarterly inspections of areas of bare soil , adjacent to infrastructure where alien plants get established. Control of any populations of invasive species by alien plant control team.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Decommissioning and Post Closure Phase	No established populations of alien invasive species at the end of each annual audit.		



				DECOMMISSIONI	NG PHASE – PLANT LIFE (FLORA)			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Fuel & Oil Storage, Stonedust Dump, Storage Yard (Temporary storage of hazardous Simunye waste), Storage Shaft Yard (Temporary storage of general, domestic and industrial waste), Sewage Treatment Plant, Oil and Silt Traps	Simunye	Habitats at sites	Direct loss of Natural Habitat in a listed Threatened Ecosystem (including CBAs)	Rehabilitation - restoration of original natural habitat	Topsoil to be returned from nearby stockpiles. Planting of a selection of indigenous grass species to stabilise topsoil and enable germination of other species represented in the topsoil seedbed. Annual audits of species richness and diversity of indigenous species.	NEMBA (10/2004)	Decommissioning and Post Closure Phase	Restoration of 75% of species richness & diversity of original natural habitat (as determined by sample sites nearby).
	Snart Complex	ex decommissioned	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species. Quarterly inspections of areas of bare soil, adjacent to infrastructure where alien plants get established. Control of any populations of invasive species by alien plant control team.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Decommissioning and Post Closure Phase	No established populations of alien invasive species at the end of each annual audit.
Underground Mining	Simunye Shaft Complex	Areas of Natural Habitat	Degradation of Natural Habitat (listed Threatened Ecosystem and CBAs) through subsidence	Minimisation - control of alien plants in areas of subsidence	Inspection of any reported areas of subsidence to ensure that no bare soils has been exposed. Quarterly inspections of areas of bare soil where plants can get established. Control of any populations of invasive species by alien plant control team.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Decommissioning and Post Closure Phase	No established populations of alien invasive species at the end of each annual audit.
Potable Water Supply System (Pipelines), Service Water Reticulation System (Pipelines),	Simunye Shaft Complex	Habitats at sites being decommissioned	Direct loss of Natural Habitat in a listed Threatened Ecosystem (including CBAs)	Rehabilitation - restoration of original natural habitat	Topsoil to be returned from nearby stockpiles. Planting of a selection of indigenous grass species to stabilise topsoil and enable germination of other species represented in the topsoil seedbed. Annual audits of species richness and diversity of indigenous species.	NEMBA (10/2004)	Decommissioning and Post Closure Phase	Restoration of 75% of species richness & diversity of original natural habitat (as determined by sample sites nearby).



DECOMMISSIONING PHASE - PLANT LIFE (FLORA)										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
Electricity Supply	Simunye Shaft Complex	Habitats at sites being decommissioned	Establishment of populations of	Minimisation - alien plant eradication	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species.	NEMBA (10/2004); Alien and	Decommissioning and Post Closure	No established populations of alien invasive		
			plant species	and management	Quarterly inspections of areas of bare soil, adjacent to infrastructure where alien plants get established. Control of any populations of invasive species by alien plant control team.	Regulations, 2014	Phase	end of each annual audit.		
PROPOSED ACTIVITIES										
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North	Areas of Natural Habitat	Degradation of Natural Habitat (listed Threatened Ecosystem and	Minimisation - control of alien plants in areas of	Inspection of any reported areas of subsidence to ensure that no bare soils has been exposed. Quarterly inspections of areas of bare soil where plants can get established.	NEMBA (10/2004); Alien and Invasive Species Regulations	Decommissioning and Post Closure Phase	No established populations of alien invasive species at the end of each		
	Reserve		CBAs) through subsidence	subsidence	by alien plant control team.	2014		annual audit.		
West Upcast and Downcast Ventilation Shafts	Shondoni Colliery - Farm Brakspruit 359 IR	Cultivated Lands	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species. Quarterly inspections of areas of bare soil, adjacent to infrastructure where alien plants	NEMBA (10/2004); Alien and Invasive Species Regulations	Decommissioning and Post Closure Phase	No established populations of alien invasive species at the end of each		
	Portions 8 & 11		F	management	Control of any populations of invasive species by alien plant control team.	2014		annual audit.		
North Upcast and Downcast Ventilation Shafts	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Habitats at sites being decommissioned	Direct loss of Natural Habitat in a listed Threatened Ecosystem	Minimisation - topsoil management and Rehabilitation -post-closure	Topsoil to be returned from nearby stockpiles. Planting of a selection of indigenous grass species to stabilise topsoil and enable germination of other species represented in the topsoil seedbed.	NEMBA (10/2004)	Decommissioning and Post Closure Phase	Restoration of 75% of species richness & diversity of original natural habitat (as determined		
		Portion 4	Ecosystem		restoration of habitat	Annual audits of species richness and diversity of indigenous species.		i nasc	by sample sites nearby).	



	DECOMMISSIONING PHASE - PLANT LIFE (FLORA)											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
North Upcast and Downcast Ventilation Shafts	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Habitats at sites being decommissioned	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Employ the services of a suitably qualified and experienced service provider for the control and management of invasive alien species. Quarterly inspections of areas of bare soil, adjacent to infrastructure where alien plants get established. Control of any populations of invasive species by alien plant control team.	NEMBA (10/2004); Alien and Invasive Species Regulations, 2014	Decommissioning and Post Closure Phase	No established populations of alien invasive species at the end of each annual audit.				



DECOMMISSIONING PHASE – ANIMAL LIFE (FAUNA)											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
SHONDONI SHAFT COMPLEX											
Access Roads	Shondoni Shaft Complex	Populations of fauna Species of Conservation Concern	Disturbance/loss of populations of fauna Species of Conservation Concern (SCC)	Minimisation - reduction of driving speed and night driving along access roads	Maximum speed limit 40km/hr. Only essential staff to be permitted to drive on access roads at night.	NEMBA (10/2004)	Decommissionin g and Closure Phase	No mortalities of any fauna SCC through collisions with vehicles.			
Conveyor System	Shondoni Shaft Complex	Populations of fauna Species of Conservation Concern	Disturbance/loss of populations of fauna Species of Conservation Concern (SCC) through noise disturbance during decommissioning activities	Minimisation - reduction in noise produced by decommissioning activities	Reduce noise produced by decommissionin g activities to an acceptable threshold as determined by noise specialist	To be determined by noise specialist	Decommissionin g and Closure Phase	Acceptable noise threshold (as determined by noise specialist) to be consistently achieved.			
Potable Water Supply System (Pipelines), Service Water Reticulation System (Pipelines), Electricity Supply	Shondoni Shaft Complex	Populations of fauna Species of Conservation Concern	Disturbance/loss of populations of fauna Species of Conservation Concern (SCC) through noise disturbance during decommissioning activities	Minimisation - reduction in noise produced by decommissioning activities	Reduce noise produced by decommissionin g activities to an acceptable threshold as determined by noise specialist	To be determined by noise specialist	Decommissionin g and Closure Phase	Acceptable noise threshold (as determined by noise specialist) to be consistently achieved.			
	1	Γ	SIMUNYE	SHAFT COMPLEX	ſ	Γ	1				
Access Roads	Simunye Shaft Complex	Populations of fauna Species of Conservation Concern	Disturbance/loss of populations of fauna Species of Conservation Concern (SCC)	Minimisation - reduction of driving speed and night driving along access roads	Maximum speed limit 40km/hr. Only essential staff to be permitted to drive on access roads at night.	NEMBA (10/2004)	Decommissionin g and Closure Phase	No mortalities of any fauna SCC through collisions with vehicles.			

Table 5.3(i): Decommissioning Phase Impact Management Measures Table – Animal Life (Fauna)



DECOMMISSIONING PHASE – ANIMAL LIFE (FAUNA)											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Security Fence and Access, Offices, Workshops and Changehouses, Internal Roads and Parking Areas, Man and Material Shaft Infrastructure, Ventilation Shaft, Potable Water Reservoir, Attenuation Dam/ Structure, Storm Water Berms and Canals, Service Water Dams (Top & Bottom)	Simunye Shaft Complex	Populations of fauna Species of Conservation Concern	Disturbance/loss of populations of fauna Species of Conservation Concern through noise disturbance during decommissioning activities	Minimisation - reduction in noise produced by decommissioning activities	Reduce noise produced by decommissionin g activities to an acceptable threshold as determined by noise specialist	To be determined by noise specialist	Decommissionin g and Closure Phase	Acceptable noise threshold (as determined by noise specialist) to be consistently achieved.			
Fuel & Oil Storage, Stonedust Dump, Storage Yard (Temporary storage of hazardous waste), Storage Yard (Temporary storage of general, domestic and industrial waste) Sewage Treatment Plant, Oil and Silt Traps	Simunye Shaft Complex	Populations of fauna Species of Conservation Concern	Disturbance/loss of populations of fauna Species of Conservation Concern through noise disturbance during decommissioning activities	Minimisation - reduction in noise produced by decommissioning activities	Reduce noise produced by decommissionin g activities to an acceptable threshold as determined by noise specialist	To be determined by noise specialist	Decommissionin g and Closure Phase	Acceptable noise threshold (as determined by noise specialist) to be consistently achieved.			
Potable Water Supply System (Pipelines), Service Water Reticulation System (Pipelines), Electricity Supply	Simunye Shaft Complex	Populations of fauna Species of Conservation Concern	Disturbance/loss of populations of fauna Species of Conservation Concern through noise disturbance during decommissioning activities	Minimisation (reduction in noise produced by decommissioning activities)	Reduce noise produced by decommissionin g activities to an acceptable threshold as determined by noise specialist	To be determined by noise specialist	Decommissionin g and Closure Phase	Acceptable noise threshold (as determined by noise specialist) to be consistently achieved.			
			PROPO	SED ACTIVITIES							
North Upcast and Downcast Ventilation Shafts	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Populations of fauna Species of Conservation Concern	Disturbance/loss of populations of fauna Species of Conservation Concern through noise disturbance during decommissioning activities	Minimisation (reduction in noise produced by decommissioning activities)	Reduce noise produced by decommissionin g activities to an acceptable threshold as determined by noise specialist	To be determined by noise specialist	Decommissionin g and Closure Phase	Acceptable noise threshold (as determined by noise specialist) to be consistently achieved.			



	DECOMMISSIONING PHASE - AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
				SHONDO	NI SHAFT COMPLEX						
					Stormwater should discharge into grassed verges and not into wetlands or watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion or discharge of			
			Decreased water quality and habitat	Manage stormwater	Decommissioning during the dry season (winter)	WUL, RQO, Best Practice Guidelines WUL ROO Best	Throughout decommissioning Throughout	stormwater into wetlands or watercourses			
			integrity (e.g.	volumes and	dissipaters to remain intact	Practice Guidelines	decommissioning	watercourses			
Access Roads	Shondoni Shaft	Aquatic ecosystems	to eroded sediments	erosion at stormwater outlets	Disturbed areas should be landscaped and re-vegetated	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	e for ration Standard to be achieved oning No erosion or discharge of stormwater into wetlands or watercourses oning Decreased runoff and improved infiltration oning Decreased runoff and improved infiltration oning Decreased runoff and improved infiltration oning No contamination of natural watercourses oning No erosion or discharge of stormwater into wetlands or oning No erosion visible downslope of development footprint Decreased runoff and improved infiltration No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			
	Complex		being carried into receiving watercourses in stormwater runoff.	and prevent sediments from reaching wetland areas.	Spills and leaks (e.g. fuel, grease and oils) should be remediated. All vehicles must be regularly inspected for leaks	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses			
					Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO			
					Stormwater should discharge into grassed areas and not into wetlands or watercourses.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion or discharge of stormwater into			
					Decommissioning during the dry season (winter)	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	wetlands or watercourses			
				Remove all solid waste and	Erosion protection and energy dissipaters to remain intact.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion visible downslope of development footprint			
			Contamination of	infrastructure from site. Re-shape	Disturbed areas should be landscaped and re-vegetated	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Standard to be achieved No erosion or discharge of stormwater into wetlands or watercourses Decreased runoff and improved infiltration No contamination of natural watercourses Ensure compliance with WUL and RQO No erosion or discharge of stormwater into wetlands or watercourses No contamination of natural watercourses No contamination of discharge of stormwater into wetlands or watercourses No erosion or discharge of stormwater into wetlands or watercourses No erosion or discharge of stormwater into wetlands or watercourses No contamination of discharge of stormwater into wetlands or watercourses No contamination of surface water, complet removal of all hazardous and solid waste to appropriate disposal facilities. Ensure compliance with WUL and RQO Ensure compliance with WUL and RQO			
Security Fence and Access	Shondoni Shaft Complex	Aquatic ecosystems	surface water and ground water from solid waste and erosion	and revegetate exposed soils. Manage stormwater volumes and velocities and trap	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			
				sediments.	Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO			
					Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO			

Table 5.3(j): Decommissioning Phase Impact Management Measures Table - Aquatic Ecosystems



				DECOMMISSIONING	PHASE - AQUATIC ECOSYSTEMS															
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved												
					Stormwater should discharge into grassed areas and not into wetlands or watercourses Decommissioning during the dry season (winter)	WUL, RQO, Best Practice Guidelines WUL, RQO, Best Practice Guidelines	Throughout decommissioning Throughout decommissioning	No erosion or discharge of stormwater into wetlands or watercourses												
					Erosion protection and energy dissipaters to remain intact.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion visible downslope of development footprint												
					Disturbed areas should be landscaped and re-vegetated	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration												
Offices, Workshops and Changehouses	Shondoni		Water quality impacts due to spills and leaks, solid	Manage stormwater. Store and dispose of	Spills and leaks (e.g. fuel, grease and oils) should be remediated. All vehicles must be regularly inspected for leaks	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses												
	Shaft Complex	Aquatic ecosystems	waste and eroded sediments via stormwater runoff	hazardous waste appropriately. Rehabilitate and	Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO												
			or seepage into groundwater.	revegetate to be free draining.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.												
					Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site												
					Dirty and clean stormwater needs to remain separated and pollution control facilities, sediment traps and settlement ponds need to remain in place until completion	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses												
			Decreased water quality and habitat	Manage stormwater volumes and	Stormwater should discharge into grassed areas and not into wetlands or watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion or discharge of stormwater into												
	Shondoni		integrity (e.g. sedimentation) due	velocities, prevent erosion at	Decommissioning during the dry season (winter)	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	wetlands or watercourses												
Internal Roads and Parking Areas	Shaft Complex	Aquatic ecosystems	to eroded sediments and contaminants being carried into	stormwater outlets and prevent sediments from	Erosion protection and energy dissipaters to remain intact	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion visible downslope of development footprint												
			receiving reaching wetland watercourses in areas. Rehabilitate	receiving reaching wetland watercourses in areas. Rehabilitate	receiving reaching wetland reaching wetland receiving areas. Rehabilitate	reaching wetland areas. Rehabilitate	reaching wetland areas. Rehabilitate	reaching wetland areas. Rehabilitate	reaching wetland areas. Rehabilitate	reaching wetland areas. Rehabilitate	reaching wetland areas. Rehabilitate	reaching wetland areas. Rehabilitate	reaching wetland areas. Rehabilitate	reaching wetland areas. Rehabilitate	reaching wetland in areas. Rehabilitate	receiving reaching wetland atercourses in areas. Rehabilitate	Disturbed areas should be landscaped and re-vegetated	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion or discharge of stormwater into wetlands or watercourses No erosion visible downslope of development footprint Decreased runoff and improved infiltration No contamination of natural watercourses Ensure compliance with WUL and RQO No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities. No infrastructure left on site No contamination of natural watercourses No erosion or discharge of stormwater into wetlands or watercourses No erosion visible downslope of development footprint Decreased runoff and improved infiltration No contamination of natural watercourses
			stormwater runoff.	and revegetate to be free draining.	Spills and leaks (e.g. fuel, grease and oils) should be remediated.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	IngNo contamination of natural watercoursesIngEnsure compliance with WUL and RQONo contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.IngNo contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.IngNo infrastructure left on siteIngNo contamination of natural watercoursesIngNo erosion or discharge of stormwater into wetlands or watercoursesIngNo erosion visible downslope of development footprintDecreased runoff and improved infiltrationNo contamination of natural watercourses												



				DECOMMISSIONING	PHASE – AQUATIC ECOSYSTEMS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
			Decreased water	Manage stormwater	All vehicles must be regularly inspected for leaks			
Internal Roads	Shondoni Shaft	Aquatic ecosystems	quality and habitat integrity (e.g. sedimentation) due to eroded sediments and contaminants	volumes and velocities, prevent erosion at stormwater outlets	Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Standard to be achieved Ensure compliance with WUL and RQO No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities. No infrastructure left on site No erosion or discharge of stormwater into wetlands or watercourses No erosion visible downslope of development footprint Decreased runoff and improved infiltration No contamination of natural watercourses Ensure compliance with WUL and RQO No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.
Areas C	Complex	being carried into receiving watercourses in stormwater runoff. stormwater runoff. be free draining. Appropriate disposal of solid waste and hazardous waste, based on classification BI Remove all infrastructure from site BI	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			
					Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site
					Stormwater should discharge into grassed areas and not into wetlands or watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion or discharge of stormwater into
					Decommissioning during the dry season (winter)	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	wetlands or watercourses
				Remove all solid	Erosion protection and energy dissipaters to remain intact	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion visible downslope of development footprint
				waste and infrastructure from site. Manage	Disturbed areas should be landscaped and re-vegetated	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Standard to be achieved Ensure compliance with WUL and RQO No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities. No infrastructure left on site No erosion or discharge of stormwater into wetlands or watercourses No erosion visible downslope of development footprint Decreased runoff and improved infiltration No contamination of natural watercourses No contamination of all ingroved infiltration No contamination of all hazardous and solid waste to appropriate with WUL and RQO
Electricity	Shondoni Shaft Compley	Aquatic ecosystems	Contamination of surface water and ground water from solid waste and	stormwater volumes and velocities and trap sediments. Rehabilitate and	Spills and leaks (e.g. fuel, grease and oils) should be remediated All vehicles must be regularly inspected for leaks	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses
Suppry	complex		erosion	revegetate to be free draining.	Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO
					Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.



	DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
					Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			
				Prevent spills and	Complete removal of infrastructure	BPEO, NEMWA	Throughout decommissioning	No remaining infrastructure			
			Water quality	and fuels in bunded areas.	Disturbed areas should be landscaped and re-vegetated and should be free-draining	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration			
Fuel & Oil Storage	Shondoni Shaft Complex	Aquatic Ecosystems	impacts due to spills and leaks, via seepage and stormwater runoff.	hazardous waste (including oil) appropriately in bunded areas	Spills and leaks (e.g. fuel, grease and oils) should be remediated. All vehicles must be regularly inspected for leaks	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses			
				Rehabilitate and revegetate to be free draining.	Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO			
					Dirty and clean stormwater needs to remain separated and pollution control facilities, sediment traps and settlement ponds need to remain in place until completion	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses			
				Channel	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			
Explosives Off-	Shondoni		Water quality impacts due to	stormwater runoff into the dirty water system until	Disturbed areas should be landscaped and re-vegetated and should be free-draining	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration			
Explosives Off- Load Area	Complex	Aquatic ecosystems	contamination via stormwater runoff.	decommissioned. Rehabilitate and	Spills and leaks should be remediated and/or disposed of appropriately	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses			
				free draining.	Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO			
					Runoff to be treated as dirty water until rehabilitated	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses			



	DECOMMISSIONING PHASE - AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					Ensure backfill does not contain metal or other contaminants	Best Practice Guidelines, WUL	Throughout decommissioning	No contamination of groundwater				
			Contamination of groundwater due to	Ensure backfill does not contain	Cover and rehabilitate to be free draining. Stormwater to be diverted away from shaft	Best Practice Guidelines	Throughout decommissioning	No rainwater or stormwater to enter shaft				
Matanu Shohuoni Material Shaft Shaft Aquat Infrastructure Complex	Shondoni Shaft Complex	Aquatic ecosystems	solid and hazardous waste (e.g. steel, PVC, tyres, lubricants, etc.) in backfill	metal and is effectively capped. Resurface and revegetate to be freedraining.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
				Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site					
			Contamination of	Dispose of waste appropriately. Remove all coal and coal dust.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
Conveyor	Shondoni Shaft	Aquatic ecosystems	surface water and groundwater by	Stormwater managed as dirty	Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site				
System	Complex		as well as solid	water until rehabilitated.	All coal and coal residue must be removed from the site	BPEO, NEMWA	Throughout decommissioning	No contamination of natural watercourses				
			Waste	Resurface and revegetate to be freedraining.	Dirty and clean stormwater needs to remain separated and pollution control facilities, sediment traps and settlement ponds need to remain in place until completion	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses				
					Ensure backfill does not contain metal or other contaminants	Best Practice Guidelines, WUL	Throughout decommissioning	No contamination of groundwater				
			Contamination of	Ensure backfill	Cover and rehabilitate to be free draining. Stormwater to be diverted away from shaft.	Best Practice Guidelines	Throughout decommissioning	No rainwater or stormwater to enter shaft				
Ventilation Shaft	Shondoni Shaft Complex	Aquatic ecosystems	solid and hazardous waste (e.g. steel, PVC, tyres, lubricants, etc.) in backfill	does not contain metal and is effectively capped. Resurface and revegetate to be freedraining.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
					Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site				



	DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Underground					Implement a wetland management and rehabilitation plan for the Waterval River and its tributaries to address mining impacts associated with Shondoni Colliery activities. This plan should consider risk of subsidence and decant post- closure.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Rehabilitate Sasol mining impacts on wetlands and watercourses according to water quality and flow objectives for the Waterval River			
	Shondoni Shaft	Aquatic ecosystems	Reduced flows and decrease in water quality in the	Prevent ingress and subsidence, rehabilitate rivers	Treat surplus mine water on surface to an acceptable standard to be released back into the environment.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Restore flows (and thereby also improve water quality) in the receiving Waterval River if affected by Sasol mining activities. Replace water in watercourses that has been lost to groundwater as a result of Sasol mining activities. Manage possible decant.			
Mining	Complex		Waterval River due to loss of surface water to groundwater and subsidence	and wetlands and improve flows and water quality in receiving watercourses	Maintain ongoing partnerships with municipalities and townships to address water quality issues in the Waterval River.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Improve water quality in the receiving Waterval River			
					Conduct biomonitoring and toxicity testing in the Waterval River and its tributaries according to a biomonitoring Plan and a surface water and groundwater monitoring plan.	WUL, RQO	Operational, Decommissioning and Post Closure	Detect potential impacts to biodiversity timeously and implement appropriate			
					Monitor flows in the Waterval River and Grootspruit with v-notch gauging weirs (or similar installation) that do not affect fish migration.	RQO	Operational, Decommissioning and Post Closure	management actions; ensure compliance with WUL and RQO			
					Leaks, spills and seepage from PCDs and pipelines carrying mine water must be prevented through monitoring and maintenance (see mitigation for PCD and pipelines).	RQO, WUL, Best Practice Guidelines	Operational, Decommissioning and Post Closure	No contamination of surface water by mine water			



	DECOMMISSIONING PHASE - AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Underground Mining	Shondoni Shaft Complex	Aquatic ecosystems	Reduced flows and decrease in water quality in the Waterval River due to loss of surface water to	Prevent ingress and subsidence, rehabilitate rivers and wetlands and improve flows and water quality in	Possible decant points after closure should be identified at the commencement of the project and provision should be made for a comprehensive long-term plan to manage mine water during the operational phase and well beyond closure.	RQO, WUL, NEMBA	Operational, Decommissioning and Post Closure	No contamination of surface water by mine water			
			groundwater and subsidence	receiving watercourses	A biodiversity management plan should be compiled and implemented. This should include targets for aquatic ecosystems through flow and water quality management.	RQO, WUL, Best Practice Guidelines	Operational, Decommissioning and Post Closure	No loss of species, achieve ecostatus targets for aquatic biota.			
Topsoil/	Shondoni	A quatia agamatang	Transport of eroded sediments into	Manage stormwater runoff and ensure sediments are trapped and prevented from	Sediment trapping mechanisms should prevent soils from being washed into wetlands.	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			
Stockpile	Complex	Aquatic ecosystems	receiving watercourses	entering watercourses or wetlands.	Exposed areas should be re- surfaced and re-vegetated as soon as possible to minimise erosion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration			
				Resurface and revegetate to be free-draining.	Alien vegetation must be managed according to an alien vegetation management plan	Biodiversity Action Plan	Throughout decommissioning and post-closure	No invasive alien vegetation			
					All coal and coal residue must be removed from the site.	BPEO, NEMWA	Throughout decommissioning	No contamination of natural watercourses			
Coal Storage in Surface Bunker	Shondoni		Contamination of surface water and groundwater by	Dispose of waste and hazardous appropriately. Remove all coal and coal dust.	Dirty and clean stormwater needs to remain separated and pollution control facilities, sediment traps and settlement ponds need to remain in place until completion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses			
	Shaft Complex	Aquatic ecosystems	runoff and seepage containing coal and coal dust, as well as contamination from solid waste	Stormwater managed as dirty water until rehabilitated. Resurface and revegetate to be	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			
				freeuranning.	Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site			



	DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
					Biomonitoring and water quality monitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning and post-closure	No contamination of natural watercourses or loss of biodiversity			
				Dispose of waste and hazardous	All coal and coal residue must be removed from the site.	BPEO, NEMWA	Throughout decommissioning	No contamination of natural watercourses			
Coal Stockpile and Throw- Out Area	Shondoni Shaft Complex	Aquatic ecosystems	Contamination of surface water and groundwater by runoff and seepage containing coal and	appropriately. Remove all coal and coal dust. Stormwater managed as dirty	Dirty and clean stormwater needs to remain separated and pollution control facilities, sediment traps and settlement ponds need to remain in place until completion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses			
	complex		coal dust, as well as contamination from solid waste	water until rehabilitated. Resurface and revegetate to be freedraining.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities. No contamination of surface water,			
Stoneduct	Shondoni		Contamination of surface water by	Manage stormwater runoff and ensure sediments are trapped and prevented from	Sediment trapping mechanisms should prevent soils from being washed into wetlands.	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			
Dump	Shaft Complex	Aquatic ecosystems	dust and sediment in stormwater runoff	entering watercourses or wetlands.	Exposed areas should be re- surfaced and re-vegetated as soon as possible to minimise erosion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration			
				Resurface and revegetate to be free-draining.	Alien vegetation must be managed according to an alien vegetation management plan	Biodiversity Action Plan	Throughout decommissioning and post-closure	No invasive alien vegetation			
Potable Water Supply System (Pipelines)	Shondoni Shaft Complex	Aquatic ecosystems	Contamination from solid waste (steel) and hazardous waste (e.g. PVC)	Remove all infrastructure and dispose of solid waste and hazardous waste appropriately. Re- shape and revegetate exposed soils. Manage stormwater volumes and	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			



	DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				velocities and trap sediments.								
Potable Water Reservoir	Shondoni Shaft Complex	Aquatic ecosystems	Eroded sediments carried in stormwater to receiving watercourses, contamination from solid waste.	Remove all infrastructure and dispose of solid waste and hazardous waste appropriately. Re- shape and revegetate exposed soils. Manage stormwater volumes and velocities and trap sediments.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
				Remove all	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
			Contamination of	dispose of solid	All waste residue must be removed from the site	BPEO, NEMWA	Throughout					
Shondoni PCD	Shondoni Shaft Complex	Aquatic ecosystems	spills, leaks, seepage and waste residue; Contamination from hazardous waste	hazardous waste appropriately. Re- shape and revegetate	Dirty and clean stormwater needs to remain separated and pollution control facilities need to remain in place until completion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses				
				exposed soils to be free draining.	PCD to be backfilled, covered with topsoil, re-landscaped to be free- draining and re-vegetated.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities. No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities. No contamination of natural watercourses or loss of biodiversity No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities. No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities. No contamination of natural watercourses No contamination of natural watercourses No contamination of natural watercourses				
					Biomonitoring and toxicity testing in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning and post-closure	No contamination of natural watercourses or loss of biodiversity				
Shondoni Incline PCD	Shondoni Shaft	Aquatic ecosystems	Contamination of surface water due to spills, leaks and waste residue;	Remove all infrastructure and dispose of solid waste and	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
	Complex	Aquatic ecosystems waste residue; waste and mplex Contamination from hazardous waste hazardous waste All waste residue must be removed BPEO, NEMWA decommissioning decommissioning	No contamination of natural watercourses									
				rr -r J.	Dirty and clean stormwater needs to remain separated and pollution	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses				



	DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Shondoni	Shondoni	Aquatic ecosystems	Contamination of surface water due to spills, leaks and	Re-shape and revegetate	control facilities need to remain in place until completion. PCD to be backfilled, covered with topsoil, re-landscaped to be free- draining and re-vegetated.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses				
Incline PCD	Shaft Complex		waste residue; Contamination from hazardous waste	exposed soils to be free draining.	Biomonitoring and toxicity testing in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning and post-closure	No contamination of natural watercourses or loss of biodiversity				
Surface	Surface Shondoni Eroded sec	Eroded sediments carried in	Remove all infrastructure and dispose of solid waste and hazardous waste appropriately. Re-	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.					
Service Water SI Reservoir Con	Shaft	Aquatic ecosystems	receiving	shape and revegetate	Complete removal of infrastructure	BPEO, NEMWA	Throughout decommissioning	waste to appropriate disposal facilities. No remaining infrastructure No remaining infractructure				
	Complex	contamination from solid waste.	exposed soils. Manage stormwater volumes and velocities and trap sediments.	Stormwater runoff to be attenuated and sediments trapped before entering wetlands	BPEO, NEMWA	Throughout decommissioning	No remaining infrastructure					
Service Water	Shondoni		Contamination of surface water due to	Prevent spills and leaks. Dispose of	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
System	Shaft Complex	Aquatic ecosystems	Contamination from	waste appropriately and	Complete removal of infrastructure	BPEO, NEMWA	Throughout decommissioning	No remaining infrastructure				
(Pipelines)			solid and hazardous waste	effectively	Stormwater runoff to be attenuated and sediments trapped before entering wetlands	BPEO, NEMWA	Throughout decommissioning	No remaining infrastructure				
					Pipelines should be regularly inspected for leaks and spills.	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water,				
Storm Water Berms and Canals	Shondoni Shaft Complex	Aquatic ecosystems	Transport of eroded sediments into receiving watercourses	Manage stormwater runoff and ensure sediments are trapped and prevented from	Sediment trapping mechanisms should prevent soils from being washed into wetlands.	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
Canals		Jlex	Matercourses	entering watercourses or wetlands.	Exposed areas should be re- surfaced and re-vegetated as soon as possible to minimise erosion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration				



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				Resurface and revegetate to be free-draining.	Alien vegetation must be managed according to an alien vegetation management plan	Biodiversity Action Plan	Throughout decommissioning and post-closure	No invasive alien vegetation				
				Prevent spills and leaks, ensure	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
	Shondoni		Water quality	bunded areas	All waste residue must be removed from the site.	BPEO, NEMWA	Throughout decommissioning	No contamination of natural watercourses				
Oil and Silt Traps	Shaft Complex	Aquatic ecosystems	and leaks and contamination via stormwater runoff.	maintained until rehabilitated. Dispose of hazardous waste	Dirty and clean stormwater needs to remain separated and pollution control facilities need to remain in place until completion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses				
				appropriately.	Complete removal of infrastructure	BPEO, NEMWA	Throughout decommissioning	No remaining infrastructure				
					Disturbed areas should be landscaped and re-vegetated and should be free-draining	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration				
					Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
			Contamination of	Remove all infrastructure and dispose of solid	All waste residue must be removed from the site.	BPEO, NEMWA	Throughout decommissioning	No contamination of natural watercourses				
Sewage Treatment Plant	Shondoni Shaft Complex	Aquatic ecosystems	surface water due to spills, leaks, seepage and waste residue; Contamination from	dispose of solid waste and hazardous waste appropriately. Re-shape and	waste and hazardous waste appropriately.	uispose of solid waste and hazardous waste appropriately.	uispose of solid waste and hazardous waste appropriately.	waste and hazardous waste appropriately.	Dirty and clean stormwater needs to remain separated and pollution control facilities need to remain in place until completion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses
Plant			hazardous waste	revegetate exposed soils to be free draining.	Rehabilitated and re-landscaped to be free-draining and re-vegetated.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses				
				free draining.	free draining.	Biomonitoring and water quality monitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning and post-closure	No contamination of natural watercourses or loss of biodiversity			
					All infrastructure to be removed from site	BPEO, NEMWA	Throughout decommissioning	No remaining infrastructure				



	DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Iso Yard (Temporary storage of general, domestic and industrial	Shondoni Shaft Complex	Aquatic ecosystems	Contamination of watercourses through seepage	Manage runoff. Dispose of waste appropriately and	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			
Temporary	-		and runoff	timeously	All waste residue must be removed from the site.	BPEO, NEMWA	Throughout decommissioning	No contamination of natural watercourses			
storage of hazardous	Shondoni		Contamination of	Manage runoff.	All infrastructure to be removed from site	BPEO, NEMWA	Throughout decommissioning	No remaining infrastructure			
waste) & Capital Yard (Temporary storage of scrap metal)	Shaft Complex	Aquatic ecosystems	watercourses through seepage and runoff	Dispose of waste appropriately and timeously	Rehabilitated and re-landscaped to be free-draining and re-vegetated.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses			
SIMUNYE SHAFT COMPLEX											
					Stormwater should discharge into grassed verges and not into wetlands or watercourses.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion or discharge of stormwater into			
					decommissioning during the dry season (winter)	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	wetlands or watercourses			
					Erosion protection and energy dissipaters to remain intact.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion visible downslope of development footprint			
			Decreased water quality and habitat	Manage stormwater	Disturbed areas should be landscaped and re-vegetated	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration			
Access Roads	Simunye Shaft Complex	Aquatic ecosystems	integrity (e.g. sedimentation) due to eroded sediments and contaminants	volumes and velocities, prevent erosion at stormwater outlets	Spills and leaks (e.g. fuel, grease and oils) should be remediated. All vehicles must be regularly inspected for leaks	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses			
			watercourses in stormwater runoff.	sediments from reaching wetland areas.	Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO			



	DECOMMISSIONING PHASE - AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					Stormwater should discharge into grassed areas and not into wetlands or watercourses.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion or discharge of stormwater into				
					decommissioning during the dry season (winter)	WUL, RQO, Best Practice Guidelines	decommissioning	wetlands or watercourses				
				Remove all solid waste and	Erosion protection and energy dissipaters to remain intact.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion visible downslope of development footprint				
	Cimunua		Contamination of	from site. Re-shape	Disturbed areas should be landscaped and re-vegetated	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration				
Security Fence and Access	Simunye Shaft Complex	Aquatic ecosystems	surface water and ground water from solid waste and erosion	and revegetate exposed soils. Manage stormwater volumes and velocities and trap	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
				seuments.	Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO				
					Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO				
					Stormwater should discharge into grassed areas and not into wetlands or watercourses.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion or discharge of stormwater into				
				Manage	decommissioning during the dry season (winter)	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	wetlands or watercourses				
			Water quality impacts due to spills	stormwater. Store and dispose of waste and	Erosion protection and energy dissipaters to remain intact.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion visible downslope of development footprint				
Offices,	Simunye		waste and eroded	appropriately.	Disturbed areas should be landscaped and re-vegetated	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration				
Workshops and Changehouses	Shaft Complex	Aquatic ecosystems	sediments via stormwater runoff or seepage into groundwater.	Ensure oil and slit traps are maintained and function optimally. Rehabilitate and revegetate to be	Spills and leaks (e.g. fuel, grease and oils) should be remediated. All vehicles must be regularly inspected for leaks	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses				
				free draining.	Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO				



DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
					Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.		
					Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site		
					Dirty and clean stormwater needs to remain separated and pollution control facilities, sediment traps and settlement ponds need to remain in place until completion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses		
					Stormwater should discharge into grassed areas and not into wetlands or watercourses.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion or discharge of stormwater into		
					decommissioning during the dry season (winter)	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	wetlands or watercourses		
				Manage	Erosion protection and energy dissipaters to remain intact.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No erosion visible downslope of development footprint		
			Decreased water quality and habitat	stormwater (volumes &	Disturbed areas should be landscaped and re-vegetated	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration		
Internal Roads and Parking	Simunye Shaft	Aquatic ecosystems	integrity (e.g. sedimentation) due to eroded sediments and	velocities), prevent erosion at stormwater outlets and prevent	Spills and leaks (e.g. fuel, grease and oils) should be remediated. All vehicles must be regularly inspected for leaks	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses		
Areas	Complex		carried into receiving	reaching wetland areas.	Water quality monitoring and biomonitoring in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Ensure compliance with WUL and RQO		
			watercourses in stormwater runoff.	revegetate to be free draining.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.		
					Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site		



	DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
					Ensure backfill does not contain metal or other contaminants	Best Practice Guidelines, WUL	Throughout decommissioning	No contamination of groundwater			
			Contamination of groundwater due to	Ensure backfill does not contain	Cover and rehabilitate to be free draining. Stormwater to be diverted away from shaft.	Best Practice Guidelines	Throughout decommissioning	No rainwater or stormwater to enter shaft			
Man and Material Shaft Infrastructure	Simunye Shaft Complex	Aquatic ecosystems	solid and hazardous waste (e.g. steel, PVC, tyres, lubricants, etc.) in backfill	metal and is effectively capped. Resurface and revegetate to be freedraining.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			
					Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site			
					Ensure backfill does not contain metal or other contaminants	Best Practice Guidelines, WUL	Throughout decommissioning	No contamination of groundwater			
Ventilation Shaft			Contamination of	Ensure backfill	Cover and rehabilitate to be free draining. Stormwater to be diverted away from shaft.	Best Practice Guidelines	Throughout decommissioning	No rainwater or stormwater to enter shaft			
	Simunye Shaft Complex	Aquatic ecosystems	groundwater due to solid and hazardous waste (e.g. steel, PVC, tyres, lubricants, etc.) in backfill	does not contain metal and is effectively capped. Resurface and revegetate to be freedraining.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			
					Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site			
Underground Mining	Simunye Shaft Complex	Aquatic ecosystems	Reduced flows and decrease in water quality in the Waterval River due to loss of surface	Prevent ingress and subsidence, rehabilitate rivers and wetlands and improve flows and	Implement a wetland management and rehabilitation plan to address mining impacts associated with Shondoni Colliery activities for the Waterval River and its tributaries. This plan should consider risk of subsidence and decant post- closure.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Rehabilitate Sasol mining impacts on wetlands and watercourses according to water quality and flow objectives for the Waterval River			
Mining			water to groundwater and subsidence	water quality in receiving watercourses	Treat surplus mine water on surface to an acceptable standard to be released back into the environment.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities. No infrastructure left on site No contamination of groundwater No rainwater or stormwater to enter shaft No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities. No infrastructure left on site Rehabilitate Sasol mining impacts on wetlands and watercourses according to water quality and flow objectives for the Waterval River Restore flows (and thereby also improve water quality) in the receiving Waterval River which has been affected by drawdown and ingress as a result of Sasol mining			


	DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
								activities. Replace water in watercourses that has been lost to groundwater as a result of Sasol mining activities. Manage possible decant.			
Sim					Maintain partnerships with municipalities to address water quality issues in the Waterval River and Grootspruit	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Improve water quality in the receiving Waterval River			
	Simunye		Reduced flows and decrease in water quality in the Waterval River due	Prevent ingress and subsidence, rehabilitate rivers and wetlands and	Conduct biomonitoring and toxicity testing in the Waterval River and its tributaries according to a biomonitoring Plan and a surface water and groundwater monitoring plan.	WUL, RQO	Operational, Decommissioning and Post Closure	Detect potential impacts to biodiversity timeously and implement			
Underground Mining	Shaft Complex	Aquatic ecosystems	to loss of surface water to groundwater and subsidence	improve flows and water quality in receiving watercourses	Monitor flows in the Waterval River and Grootspruit with v-notch gauging weirs (or similar installation) that do not affect fish migration	RQO	Operational, Decommissioning and Post Closure	management actions; ensure compliance with WUL and RQO			
					Leaks, spills and seepage from PCDs and pipelines carrying mine water must be prevented through monitoring and maintenance (see mitigation for PCD and pipelines)	RQO, WUL, Best Practice Guidelines	Throughout Operational Phase	Detect potential impacts to biodiversity timeously and implement appropriate management actions; ensure compliance with WUL and RQO No contamination of surface water by mine water			
					Possible decant points after closure should be identified at the commencement of the project and provision should be made for a comprehensive long-term plan to manage mine water during the operational phase and well beyond closure. This should include treatment options.	RQO, WUL, NEMBA	Operational, Decommissioning and Post Closure	No contamination of surface water by mine water			
					A biodiversity management plan should be compiled and implemented. This should include targets for aquatic ecosystems through flow and water quality management.	RQO, WUL, Best Practice Guidelines	Operational, Decommissioning and Post Closure	No loss of species, achieve ecostatus targets for aquatic biota.			



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Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
			Transport of eroded	Manage stormwater runoff and ensure sediments are trapped and	Sediment trapping mechanisms should prevent soils from being washed into wetlands.	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
Topsoil/ Overburden Stockpile	Simunye Shaft Complex	Aquatic ecosystems	sediments into receiving watercourses	prevented from entering watercourses or wotlands	Exposed areas should be re- surfaced and re-vegetated as soon as possible to minimise erosion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration				
				wetlands. Resurface and revegetate to be free-draining.	Alien vegetation must be managed according to an alien vegetation management plan	Biodiversity Action Plan	Throughout decommissioning and post-closure	No invasive alien vegetation				
Stonedust	Simunye		Contamination of surface water by	Manage stormwater runoff and ensure sediments are trapped and prograted from	Sediment trapping mechanisms should prevent soils from being washed into wetlands.	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
Dump	Shaft Complex	Aquatic ecosystems	dust and sediment in stormwater runoff	entering watercourses or wetlands	Exposed areas should be re- surfaced and re-vegetated as soon as possible to minimise erosion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration				
				Resurface and revegetate to be free-draining.	Alien vegetation must be managed according to an alien vegetation management plan	Biodiversity Action Plan	Throughout decommissioning and post-closure	No invasive alien vegetation				
Potable Water Supply System (Pipelines)	Simunye Shaft Complex	Aquatic ecosystems	Contamination from solid waste (steel) and hazardous waste (e.g. PVC)	Remove all infrastructure and dispose of solid waste and hazardous waste appropriately. Re- shape and revegetate exposed soils. Manage stormwater volumes and velocities and trap sediments.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
Potable Water Reservoir	Simunye Shaft Complex	Aquatic ecosystems	Eroded sediments carried in stormwater to	Remove all infrastructure and dispose of solid	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of				



	DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
			receiving watercourses, contamination from solid waste.	waste and hazardous waste appropriately. Re- shape and revegetate exposed soils. Manage stormwater volumes and velocities and trap sediments.				all hazardous and solid waste to appropriate disposal facilities.				
					Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
			Contomination of	Remove all infrastructure and	All waste residue must be removed from the site.	BPEO, NEMWA	Throughout decommissioning	ng all hazardous and solid waste to appropriate disposal facilities. ng No contamination of natural watercourses				
Service Water Dam (Top) &	Simunye Shaft	Aquatic ecosystems	surface water due to spills, leaks and waste residue	dispose of solid waste and hazardous waste appropriately	Dirty and clean stormwater needs to remain separated and pollution control facilities need to remain in place until completion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses				
Dam (Bottom)	Complex		from hazardous waste	Re-shape and revegetate exposed soils to be	PCD to be backfilled, covered with topsoil, re-landscaped to be free- draining and re-vegetated.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses				
				free draining.	Biomonitoring and toxicity testing in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning and post-closure	No contamination of natural watercourses or loss of biodiversity				
Service Water Reticulation	Simunye Shaft	Aquatic ecosystems	Contamination of surface water due to spills, leaks;	Prevent spills and leaks, Dispose of waste	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
System (Pipelines) C	Complex		solid and hazardous	appropriately and effectively	Complete removal of infrastructure	BPEO, NEMWA	Throughout decommissioning	No remaining infrastructure				
			waste		Stormwater runoff to be attenuated and sediments trapped before entering wetlands	BPEO, NEMWA	Throughout decommissioning	No remaining infrastructure				
Storm Water Berms and Canals	Simunye Shaft Complex	Aquatic ecosystems	Transport of eroded sediments into receiving watercourses	Manage stormwater runoff and ensure sediments are	Sediment trapping mechanisms should prevent soils from being washed into wetlands.	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid				



				DECOMMISSIONING	PHASE – AQUATIC ECOSYSTEMS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
				trapped and prevented from				waste to appropriate disposal facilities.
				entering watercourses or wetlands. Resurface and revegetate to be free-draining.	Exposed areas should be re- surfaced and re-vegetated as soon as possible to minimise erosion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	Decreased runoff and improved infiltration
					Alien vegetation must be managed according to an alien vegetation management plan	Biodiversity Action Plan	Throughout decommissioning and post-closure	No invasive alien vegetation
				Remove all	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.
Sewage Treatment Plant			Contamination of	infrastructure and	All waste residue must be removed from the site	BPEO, NEMWA	Throughout	
	Simunye Shaft Complex	Aquatic ecosystems	surface water due to spills, leaks, seepage and waste residue Contamination from	waste and hazardous waste appropriately. Re-shape and	Dirty and clean stormwater needs to remain separated and pollution control facilities need to remain in place until completion.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses
			hazardous waste	revegetate exposed soils to be free draining.	Treatment ponds to be backfilled, covered with topsoil, re-landscaped to be free-draining and re- vegetated.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	
					Biomonitoring and toxicity testing in receiving watercourses	WUL, RQO, Best Practice Guidelines	Throughout decommissioning and post-closure	No contamination of natural watercourses or loss of biodiversity
Storage Yard (Temporary storage of general, domestic and	Simunye		Contamination of	Manage runoff.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.
industrial waste & Shaft Complex Temporary storage of	Aquatic ecosystems	watercourses through seepage and runoff	Dispose of waste appropriately and timeously	All waste residue must be removed from the site.	BPEO, NEMWA	Throughout decommissioning	No contamination of natural watercourses	
					All infrastructure to be removed from site	BPEO, NEMWA	Throughout decommissioning	No contamination of natural watercourses or loss of biodiversity No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities. No contamination of natural watercourses No remaining infrastructure No contamination of
waste)					Rehabilitated and re-landscaped to be free-draining and re-vegetated.	WUL, RQO, Best Practice Guidelines	Throughout decommissioning	No contamination of natural watercourses



	DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
	PROPOSED ACTIVITIES										
Underground Mining (New Block 8 North)					Implement a wetland management and rehabilitation plan to address mining impacts associated with Shondoni colliery activities for the Waterval River and its tributaries. This plan should consider risk of subsidence and decant post- closure.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Rehabilitate Sasol mining impacts on wetlands and watercourses according to water quality and flow objectives for the Waterval River			
	Shondoni Colliery – New Block 8 North Reserve	Aquatic ecosystems	Reduced flows and decrease in water quality in the Waterval River due to loss of surface water to groundwater and subsidence	Prevent ingress and subsidence, rehabilitate rivers and wetlands and improve flows and water quality in receiving watercourses	Treat surplus mine water on surface to an acceptable standard to be released back into the environment.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Restore flows (and thereby also improve water quality) in the receiving Waterval River which has been affected by drawdown and ingress as a result of Sasol mining activities. Replace water in watercourses that has been lost to groundwater as a result of Sasol mining activities. Manage possible decant.			
					Maintain partnerships with municipalities to address water quality issues in the Waterval River according to auditable targets.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Improve water quality in the receiving Waterval River			
					Conduct biomonitoring and toxicity testing in the Waterval River and its tributaries according to a biomonitoring plan and a surface water and groundwater monitoring plan.	WUL, RQO	Operational, Decommissioning and Post Closure	Detect potential impacts to biodiversity timeously and implement appropriate			
					Monitor flows in the Waterval River using a gauging weir	RQO	Operational, Decommissioning and Post Closure	ensure compliance with WUL and RQO			
					Possible decant points after closure should be identified at the commencement of the project and	RQO, WUL, NEMBA	Operational, Decommissioning and Post Closure	No contamination of surface water by mine water			



	DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Aquatic ecosystems	Reduced flows and decrease in water quality in the Waterval River due to loss of surface	Prevent ingress and subsidence, rehabilitate rivers and wetlands and improve flows and	provision should be made for a comprehensive long-term plan to manage mine water during the operational phase and well beyond closure.						
			water to groundwater and subsidence	water quality in receiving watercourses	A biodiversity management plan should be compiled and implemented. This should include targets for aquatic ecosystems through flow and water quality management. PES categories below C as a result of Sasol mining activities should trigger management intervention.	RQO, WUL, Best Practice Guidelines	Operational, Decommissioning and Post Closure	No loss of species, achieve ecostatus targets for aquatic biota.			
					Ensure backfill does not contain metal or other contaminants	Best Practice Guidelines WIII	Throughout	No contamination of groundwater			
	Shondoni		Contamination of groundwater due to	Ensure backfill does not contain	Cover and rehabilitate to be free draining. Stormwater to be diverted away from shaft.	Best Practice Guidelines	Throughout decommissioning	No rainwater or stormwater to enter shaft			
West Upcast Ventilation Shaft	Farm Brakspruit 359 IR Portion 11	Aquatic ecosystems	solid and hazardous waste (e.g. steel, PVC, tyres, lubricants, etc.) in backfill	metal and is effectively capped. Resurface and revegetate to be freedraining.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			
					Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site			
					Ensure backfill does not contain metal or other contaminants	Best Practice Guidelines, WUL	Throughout decommissioning	No contamination of groundwater			
West Downcast Ventilation	Shondoni Colliery - Farm Brakspruit	Aquatic ecosystems	Contamination of groundwater due to solid and hazardous waste (e.g. steel, PVC, tyres,	Ensure backfill does not contain metal and is effectively capped. Resurface and	Cover and rehabilitate to be free draining. Stormwater to be diverted away from shaft.	Best Practice Guidelines	Throughout decommissioning	No rainwater or stormwater to enter shaft			
Ventilation Shaft	359 IR Portion 8		lubricants, etc.) in backfill	revegetate to be freedraining.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.			



	DECOMMISSIONING PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
					Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site				
					Ensure backfill does not contain metal or other contaminants	Best Practice Guidelines, WUL	Throughout decommissioning	No contamination of groundwater				
Nouth Humoret	Shondoni Colliery - Farm		Contamination of groundwater due to solid and hazardous	Ensure backfill does not contain metal and is	Cover and rehabilitate to be free draining. Stormwater to be diverted away from shaft.	Best Practice Guidelines	Throughout decommissioning	No rainwater or stormwater to enter shaft				
North Upcast Ventilation Shaft	Kromdraai 128 IS Portion 4	Aquatic ecosystems	waste (e.g. steel, PVC, tyres, lubricants, etc.) in backfill	effectively capped. Resurface and revegetate to be freedraining.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Aquatic ecosystems	Contamination of groundwater due to solid and hazardous waste (e.g. steel, PVC, tyres, lubricants, etc.) in backfill	Ensure backfill does not contain metal and is effectively capped. Resurface and revegetate to be freedraining.	Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site				
					Ensure backfill does not contain metal or other contaminants	Best Practice Guidelines, WUL	Throughout decommissioning	No contamination of groundwater				
Novth	Shondoni		Contamination of groundwater due to	Ensure backfill does not contain	Cover and rehabilitate to be free draining. Stormwater to be diverted away from shaft.	Best Practice Guidelines	Throughout decommissioning	No rainwater or stormwater to enter shaft				
North Downcast Ventilation Shaft	Farm Kromdraai 128 IS Portion 4	Aquatic ecosystems Aquatic ecosystems	solid and hazardous maste (e.g. steel, effe PVC, tyres, R lubricants, etc.) in re- backfill f	metal and is effectively capped. Resurface and revegetate to be freedraining.	Appropriate disposal of solid waste and hazardous waste, based on classification	BPEO, NEMWA	Throughout decommissioning	No contamination of surface water, complete removal of all hazardous and solid waste to appropriate disposal facilities.				
					Remove all infrastructure from site	BPEO, NEMWA	Throughout decommissioning	No infrastructure left on site				



				DECOMMISSIC	DNING PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
				SHONDO	DNI SHAFT COMPLEX			
Access Roads					Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
			Decommissioning		Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
			infrastructures could lead to mobilisation and transport of	Modify and control. Prevent mobilisation and	Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.
	Shondoni Shaft Complex	Wetlands	wetlands; water quality deterioration due to seepage / leaks of	transport of sediment, remove waste and contaminants, revegetate	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Best Decommissioning and Closure Phases s	No contaminated soils to remain on site.
			waste; disturbance of wetland habitat where activities take place in wetlands or	disturbed areas, rehabilitate wetlands, control invasive alien	Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation
			in close proximity; increase in invasive alien vegetation.	vegetation.	No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases Decommissioning and Closure Phases	No solid waste remaining on site.
			alien vegetation.		Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
					Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
Security Fence and Access; Offices, Workshops and Changehouses;	Shondoni Shaft Complex	Wetlands	Decommissioning and removal of infrastructures could lead to;	Modify and control.	Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.

Table 5.3(k): Decommissioning Phase Impact Management Measures Table - Wetlands



				DECOMMISSIO	NING PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
					Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
Internal Roads and Parking Areas: Man and			Mobilisation and transport of sediment	Prevent mobilisation and	Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.
Areas; Man and Material Shaft Infrastructure; Ventilation Shaft; Potable Water	Shondoni Shaft	Wetlands	into wetlands; water quality deterioration due to seepage / leaks of contaminants; solid	transport of sediment, remove waste and contaminants, revegetate	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No contaminated soils to remain on site.
Reservoir; Attenuation Dam/ Structure; Storm Water	Complex		waste; disturbance of wetland habitat where activities take place in wetlands or	disturbed areas, rehabilitate wetlands, control invasive alien	Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation
Berms and Canals			in close proximity; increase in invasive alien vegetation.	vegetation.	No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.
					Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
					Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
Fuel & Oil Storage; Explosives Off- Load Area; Coal storage in	Shondoni Shaft	Wetlands	Decommissioning and removal of infrastructures could lead to mobilisation	Modify and	Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
storage in Shaft Surface Bunker; Complex Coal Stockpile and Throw-Out Area; Stonedust Dump; L		and transport of sediment into wetlands;	control.	Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Phases erosion in adjacent v No disturt footprints remain ba vegetation Decommissioning and Closure No contan soils to rep site. Decommissioning and Closure No contan soils to rep site. Decommissioning and Closure No new infestation invasive a vegetation Decommissioning and Closure No solid w remaining Phases No solid w remaining Decommissioning and Closure No solid w remaining Decommissioning and Closure No sedime in adjacent v Decommissioning and Closure No furthe: degradatin Phases Decommissioning and Closure No furthe: degradatin wetland h Decommissioning and Closure No furthe: degradatin wetland h Decommissioning and Closure No furthe: degradatin wetland h Decommissioning and Closure No sedime in adjacent wetland h	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.	



				DECOMMISSIC	DNING PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Shondoni PCD; Shondoni Incline					Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.
PCD; Surface Service Water Reservoir; Capital Yard (Temporary storage of scrap metal); Iso Yard			Water quality deterioration due to seepage / leaks of contaminants;	Prevent mobilisation and transport of sediment, remove	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No contaminated soils to remain on site.
metal); Iso Yard (Temporary storage of hazardous	Shondoni Shaft Complex	Wetlands	solid waste; disturbance of wetland habitat where activities take	waste and contaminants, revegetate disturbed areas,	Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation
waste); Iso Yard (Temporary storage of general, domestic and industrial waste); Sewage Treatment Plant Oil and Silt Traps			place in wetlands or in close proximity; increase in invasive alien vegetation.	rehabilitate wetlands, control invasive alien vegetation.	No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.
					Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
					Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
			Decommissioning		Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
Conveyor System	Shondoni Shaft Complex	Wetlands	and removal of infrastructures could lead to mobilisation and transport of sediment into	Modify and control.	Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
			wetlands;		Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.



				DECOMMISSIO	NING PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
					Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No contaminated soils to remain on site.
Conveyor System	Shondoni		Water quality deterioration due to seepage / leaks of	Prevent mobilisation and transport of sediment, remove	Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation
	Shaft Complex	Wetlands	contaminants; solid waste; disturbance of wetland habitat where activities take	waste and contaminants, revegetate disturbed areas,	No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.
			place in wetlands or in close proximity; w increase in invasive alien vegetation.	rehabilitate wetlands, control invasive alien vegetation.	Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
					Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
			Subsidence leading to altered flow distribution and	Stop, control and modify. Stop uncontrolled	Undertake a detailed subsidence risk assessment to identify areas likely to subside.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.
Underground Mining	Shondoni Shaft Complex	Wetlands	retention patterns in wetlands; reduced flow in wetlands leading to habitat degradation; water quality deterioration due to decant of contaminated mine water.	decant and treat an contaminated water prior to discharge. Limit subsidence, rehabilitate areas affected by	Undertake regular subsidence monitoring to identify new areas of subsidence and determine significance of subsided areas in terms of impact on surface flow and groundwater.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.
				subsidence.	Develop and implement subsidence rehabilitation plans. Any subsidence affecting wetlands must include a wetland ecologist in rehabilitation planning.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately



				DECOMMISSIC	NING PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
								within 1year of occurrence.
Underground Mining	Shondoni Shaft	Wetlands	Subsidence leading to altered flow distribution and retention patterns in wetlands; reduced flow in wetlands	Stop, control and modify. Stop uncontrolled decant and treat an contaminated water prior to	Implement a water management strategy and treatment plan to prevent uncontrolled decant of contaminated mine water. Treated water to be discharged into the environment	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	No discharge or decant of contaminated mine water into the environment.
Mining	Complex		leading to habitat degradation; water quality deterioration due to decant of contaminated mine water.	discharge. Limit subsidence, rehabilitate areas affected by subsidence.	A detailed, catchment wide wetland and water monitoring strategy must be developed and implemented. Such a monitoring strategy must include flow monitoring in numerous locations across the catchment.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Detect potential impacts to biodiversity timeously and implement appropriate management actions
			Decommissioning and removal of infrastructures could		Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
			lead to mobilisation and transport of sediment into wetlands	Modify and control Prevent	Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
Topsoil/ Overburden Stockpile	Shondoni Shaft Complex	Wetlands	Water quality deterioration due to seepage / leaks of	mobilisation and transport of sediment	Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.
Stockpile			contaminants, solid waste Disturbance of	Remove waste and contaminants	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No contaminated soils to remain on site.
			wetland habitat where activities take place in wetlands or in close proximity	Revegetate disturbed areas	Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation
					No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.



	DECOMMISSIONING PHASE - WETLANDS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Topsoil/ Overburden Stockpile	Shondoni Shaft Complex	Wetlands	Increase in invasive alien vegetation	Rehabilitate wetlands	Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.			
				alien vegetation	Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.			
					Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.			
Potable Water Supply System (Pipelines) Service Water Reticulation			Decommissioning and removal of		Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	or ionStandard to be achievedingNo sediment fans in adjacent wetlands and no erosion in adjacent wetlands.ingNo further degradation of wetland habitat.ingNo further degradation of wetlands and no erosion in adjacent wetlands.ingNo sediment fans in adjacent wetlands.ingNo disturbed footprints to remain bare of vegetation.ingNo contaminated soils to remain on site.ingNo new infestations of invasive alien vegetationingNo solid waste remaining on site.ingNo sediment fans in adjacent wetlands and no erosion in adjacent wetlands.ingNo sediment fans in adjacent wetlands and no erosion in adjacent wetlands.			
			infrastructures could lead to mobilisation and transport of sediment into	Modify and control.	Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.			
System (Pipelines) Electricity Supply Potable Water	Shondoni Shaft Complex	Wetlands	wetlands. Water quality deterioration due to seepage / leaks of contaminants, Solid	Prevent mobilisation and transport of sediment, remove waste and	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	Standard to be achievedNo sediment fans in adjacent wetlands and no erosion in adjacent wetlands.No further degradation of wetland habitat.No further degradation of wetland habitat.No further degradation of wetland habitat.No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.No disturbed footprints to remain bare of vegetation.No contaminated soils to remain on site.No new infestations of invasive alien vegetationNo solid waste remaining on site.No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.No solid waste remaining on site.No solid waste remaining on site.No further degradation of wetlands and no erosion in adjacent wetlands.No further degradation of wetland habitat.			
Supply System (Pipelines) Service Water Reticulation			waste. Disturbance of wetland habitat where activities take	contaminants, revegetate disturbed areas, rehabilitate	Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation			
System (Pipelines) Electricity			place in wetlands or in close proximity. Increase in invasive	wetlands, control invasive alien vegetation.	No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.			
Electricity Supply			Increase in invasive alien vegetation	vegetation.	Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.			
					Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.			



				DECOMMISSIO	NING PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
				SIMUNY	YE SHAFT COMPLEX			
					Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
			Decommissioning		Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
			and removal of infrastructures could lead to mobilisation and transport of		Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.
Access Roads	Simunye Shaft	Wetlands	and transport of sediment into wetlands. Water quality deterioration due to seenage / leaks of	mouny and control. Prevent mobilisation and transport of sediment, remove waste and contaminants, revegetate	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No contaminated soils to remain on site.
	Complex		contaminants, solid waste. Disturbance of wetland habitat		Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation
			where activities take place in wetlands or in close proximity.	rehabilitate wetlands, control	No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.
			Increase in invasive alien vegetation	vegetation.	Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
					Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
Security Fence and Access Offices, Workshops and	Simunye Shaft Complex	Wetlands	Decommissioning & removal of infrastructures could lead to mobilisation and transport of	Modify and control.	Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.



	DECOMMISSIONING PHASE - WETLANDS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Changehouses Internal Roads and Parking			sediment into wetlands. Water quality		Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.			
Areas Man and Material Shaft Infrastructure			deterioration due to seepage / leaks of contaminants, solid waste.	Prevent mobilisation and transport of sediment, remove waste and contaminants,	Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.			
Ventilation Shaft Potable Water Reservoir Attenuation Dam/ Structure Storm Water Berms and Canals Service Water Dam (Top) Service Water Dam (Bottom)	Simunye	unye aft aft pplex Wetlands Wetlands Wetlands or in close proximity. nplex Wetlands Increase in invasive alien vegetation. Wetlands Increase in invasive alien vegetation. No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of. Install erosion protection measures as an where required to prevent erosion in receiving wetlands.	Disturbance of wetland habitat where activities take place in wetlands or		mobilisation and transport of sediment, remove waste and contaminants,	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No contaminated soils to remain on site.		
	Shaft Complex		Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation					
				invasive alien vegetation.	No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.			
					Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.			
					Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.			
Fuel & Oil Storage;			Decommissioning and removal of infrastructures could lead to mobilisation		Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.			
Storage, Storage Yard (Temporary storage of hazardous waste)	Simunye Shaft Complex	ye t Wetlands ex	and transport of sediment into wetlands. Water quality deterioration due to seepage / leaks of contaminants; solid waste.	Modify and control.	Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.			
				·	Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.			



				DECOMMISSIC	NING PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
					Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No contaminated soils to remain on site.
Storage Yard			Disturbance of	Prevent mobilisation and transport of	Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation
(Temporary storage of general, domestic and industrial waste); Sewage Treatment Plant; Oil and Silt Traps	Simunye Shaft	Wetlands	wetland habitat where activities take place in wetlands or	sediment, remove waste and contaminants,	No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.
	Complex		in close proximity. Increase in invasive alien vegetation.	revegetate disturbed areas, rehabilitate wetlands, control	Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
				invasive alien vegetation.	Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
					Undertake a detailed subsidence risk assessment to identify areas likely to subside.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	
			Subsidence leading to altered flow	Stop, control and	Undertake regular subsidence monitoring to identify new areas of subsidence and determine significance of subsided areas in terms of impact on surface flow and groundwater.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1 year of
	Simunye		distribution and retention patterns in wetlands; reduced flow in wetlands	modify. Stop uncontrolled decant and treat an contaminated	Develop and implement subsidence rehabilitation plans. Any subsidence affecting wetlands must include a wetland ecologist in rehabilitation planning.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	occurrence.
Underground Mining	Shaft Complex	Wetlands	leading to habitat degradation; Water quality deterioration due to decant of	water prior to discharge. Limit subsidence, rehabilitate areas affected by	Implement a water management strategy and treatment plan to prevent uncontrolled decant of contaminated mine water. Treated water to be discharged into the environment	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	No discharge or decant of contaminated mine water into the environment.
			contaminated mine water.	subsidence.	A detailed, catchment wide wetland and water monitoring strategy must be developed and implemented. Such a monitoring strategy must include flow monitoring in numerous locations across the catchment.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Detect potential impacts to biodiversity timeously. Implement appropriate management actions.



	DECOMMISSIONING PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	r Standard to be achieved ng No further degradation of wetland habitat. ng No sediment fans in adjacent wetlands & no erosion in adjacent wetlands. ng No sediment fans in adjacent wetlands & no erosion in adjacent wetlands. ng No disturbed footprints to remain bare of vegetation. ng No contaminated soils to remain on site. ng No contaminated soils to remain on site. ng No solid waste remaining on site. ng No solid waste remaining on site. ng No sediment fans in adjacent wetlands & no erosion in adjacent of wetland habitat. ng No further degradation of wetland habitat. ng No further degradation of wetland habitat. ng No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.					
Topsoil/ Overburden Stockpile			Decommissioning and removal of		Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands & no erosion in adjacent wetlands.				
			infrastructures could lead to mobilisation and transport of sediment into	Modify and control. Prevent mobilisation and	Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.				
	Simunye Shaft Complex	Wetlands	wetlands; water quality deterioration due to seepage / leaks of contaminants; solid	transport of sediment, remove waste and contaminants, revegetate disturbed areas	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	Standard to be achieved g Standard to be achieved g No further degradation of wetland habitat. g No sediment fans in adjacent wetlands & no erosion in adjacent wetlands. g No sediment fans footprints to remain bare of vegetation. g No contaminated soils to remain on site. g No new infestations of invasive alien vegetation. g No solid waste remaining on site. g No solid waste remaining on site. g No sediment fans in adjacent wetlands & no erosion in adjacent metlands. g No further degradation of wetland habitat. g No further degradation of wetland habitat. g No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.				
			waste; disturbance of wetland habitat where activities take place in wetlands or	rehabilitate wetlands, control invasive alien	Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation.				
			in close proximity; increase in invasive alien vegetation.	vegetation.	No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.				
	alien vegetation. alien vegetation. appropriately disposed of. Install erosion protection r where required to prevent receiving wetlands. Develop & implement a we rehabilitation plan for any affected and degraded by d	Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands & no erosion in adjacent wetlands.							
				Develop & implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.					
Potable Water Supply System (Pipelines); Service Water Reticulation System (Pipelines); Electricity Supply	Simunye Shaft		Decommissioning and removal of infrastructures could lead to mobilisation and transport of	Modify and	Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.				
	Complex	Wetlands	sediment into wetlands; water quality deterioration due to seepage /	control.	Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.				



				DECOMMISSIO	NING PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
			leaks of contaminants;		Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.
				Prevent mobilisation and transport of sediment, remove	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No contaminated soils to remain on site.
Potable Water Supply System (Pipelines); Service Water	Simunye Shaft Complex	Wetlands	Solid waste; disturbance of wetland habitat where activities take	waste and contaminants, revegetate disturbed areas,	Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation
Reticulation System (Pipelines);			place in wetlands or in close proximity; increase in invasive	rehabilitate wetlands, control invasive alien	No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	Standard to be achieved Standard to be achieved Standard to be achieved B No disturbed footprints to remain bare of vegetation. g No contaminated soils to remain on site. g No new infestations of invasive alien vegetation g No solid waste remaining on site. g No solid waste remaining on site. g No sediment fans in adjacent wetlands and no erosion in adjacent wetlands. g No further degradation of wetland habitat. g Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence. g Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.
Electricity Supply			alien vegetation.	vegetation.	Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
					Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
				PROP	OSED ACTIVITIES			
	Shondoni Colliery –	Wetlands	Subsidence leading to altered flow distribution and retention patterns in wetlands; reduced	Stop, control and modify. Stop uncontrolled decant and treat an contaminated	Undertake a detailed subsidence risk assessment to identify areas likely to subside.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.
Underground Mining (New Block 8 North)	Shondoni Colliery – Wetland New Block 8 North Reserve	Wetlands wetlands; reduced flow in wetlands leading to habitat degradation; water quality deterioration due to decant of contaminated mine water.		water prior to discharge. Limit subsidence, rehabilitate areas affected by subsidence.	Undertake regular subsidence monitoring to identify new areas of subsidence and determine significance of subsided areas in terms of impact on surface flow and groundwater.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.



				DECOMMISSIO	NING PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
	Shondoni		Subsidence leading to altered flow distribution and	Stop, control and modify. Stop uncontrolled	Develop and implement subsidence rehabilitation plans. Any subsidence affecting wetlands must include a wetland ecologist in rehabilitation planning.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.
Underground Mining (New Block 8 North)	Colliery – New Block 8 North Reserve	Wetlands	retention patterns in wetlands; reduced flow in wetlands leading to habitat degradation; water	decant and treat an contaminated water prior to discharge. Limit subsidence,	Implement a water management strategy and treatment plan to prevent uncontrolled decant of contaminated mine water. Treated water to be discharged into the environment	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	No discharge or decant of contaminated mine water into the environment.
			quality deterioration due to decant of contaminated mine water.	rehabilitate areas affected by subsidence.	A detailed, catchment wide wetland and water monitoring strategy must be developed and implemented. Such a monitoring strategy must include flow monitoring in numerous locations across the catchment.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Detect potential impacts to biodiversity timeously and implement appropriate management actions
			Decommissioning and removal of		Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
	Shondoni Colliery -		infrastructures could lead to mobilisation and transport of sediment into wetlands; water	Modify and control. Prevent mobilisation and transport of sediment, remove	Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
West Upcast Ventilation Shaft	Farm Brakspruit 359 IR Portion 11	Wetlands	quality deterioration due to seepage / leaks of contaminants; solid	waste and contaminants, revegetate disturbed areas,	Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.
			waste; disturbance of wetland habitat where activities take place in wetlands or in close proximity:	rehabilitate wetlands, control invasive alien vegetation.	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No contaminated soils to remain on site.
			increase in invasive alien vegetation.		Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation



	DECOMMISSIONING PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
			Decommissioning and removal of	Modify and control. Prevent	No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.				
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit	Wetlands	infrastructures could lead to mobilisation and transport of sediment into wetlands; water	mobilisation and transport of sediment, remove waste and contaminants,	mobilisation and transport of sediment, remove waste and contaminants	mobilisation and transport of sediment, remove waste and contaminants,	mobilisation and transport of sediment, remove waste and contaminants,	mobilisation and transport of sediment, remove waste and contaminants,	Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	Standard to be achievedNo solid waste remaining on site.No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.No further degradation of wetland habitat.No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.No disturbed footprints to remain bare of vegetation.No contaminated soils to remain on site.No new infestations of invasive alien
	Portion 11 quality deteriorati leaks of waste; disturbance wetland habitat	quality deterioration due to seepage / leaks of contaminants; solid	revegetate disturbed areas, rehabilitate wetlands, control	Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	No further degradation of wetland habitat.							
			waste; disturbance of wetland habitat where activities take place in wetlands or in close proximity; increase in invasive alien vegetation.	invasive alien vegetation.	Backfill shaft and shape to be free-draining to limit ingress. No ponding of water on surface. Revegetate as soon as possible.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.				
			Decommissioning		Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.				
	Shondoni		and removal of infrastructures could lead to mobilisation and transport of sediment into	Modify and control. Prevent mobilisation and transport of	Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.				
West Downcast Ventilation Shaft	Colliery - Farm Brakspruit 359 IR	Wetlands	wetlands; water quality deterioration due to seepage / leaks of	sediment, remove waste and contaminants, revegetate	Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.				
	Portion 8		leaks of contaminants; solid waste; disturbance of wetland habitat where activities take place in wetlands or	disturbed areas, rehabilitate wetlands, control invasive alien vegetation.	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No contaminated soils to remain on site.				
			in close proximity; increase in invasive alien vegetation.		Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation				



				DECOMMISSIC	NING PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
			Decommissioning and removal of infrastructures could		No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.
	Shondoni Colliery -		lead to mobilisation and transport of sediment into wetlands; water quality deterioration	Modify and control. Prevent mobilisation and transport of	Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
West Downcast Ventilation Shaft	Farm Brakspruit 359 IR Portion 8	Wetlands	due to seepage / leaks of contaminants; solid waste; disturbance of	sediment, remove waste and contaminants, revegetate	Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
			wetland habitat where activities take place in wetlands or in close proximity; increase in invasive alien vegetation.	disturbed areas, rehabilitate wetlands, control invasive alien vegetation.	Backfill shaft and shape to be free-draining to limit ingress. No ponding of water on surface. Revegetate as soon as possible.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
			Decommissioning		Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
	Shondoni		and removal of infrastructures could lead to mobilisation and transport of sediment into	Modify and control. Prevent mobilisation and	Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
North Upcast Ventilation Shaft	Colliery - Farm Kromdraai 128 IS	Wetlands	wetlands; water quality deterioration due to seepage / leaks of	r mobilisation and r transport of ion sediment, remove / waste and contaminants.	Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	Standard to be achievedNo solid waste remaining on site.No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.No further degradation of wetland habitat.No sediment fans in adjacent wetlands and no erosion in adjacent wetlands. No disturbed footprints to remain bare of vegetation.No contaminated soils to remain on site.No new infestations of invasive alien vegetation.No solid waste remaining on site.
	Portion 4		contaminants; solid waste; disturbance of wetland habitat where activities take place in wetlands or	revegetate disturbed areas, rehabilitate wetlands, control invasive alien	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No contaminated soils to remain on site.
			place in wetlands or in close proximity; increase in invasive alien vegetation.	vegetation.	Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation.
					No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.



	DECOMMISSIONING PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
North Upcast	Shondoni Colliery - Farm		Decommissioning and removal of infrastructures could lead to mobilisation	Modify and control. Prevent mobilisation and	Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.				
Ventilation Shaft	Kromdraai 128 IS Portion 4	Wetlands	and transport of sediment into wetlands; water quality deterioration	transport of sediment, remove waste and contaminants,	Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	Develop and implement a wetland rehabilitation plan for any wetlands directly iffected and degraded by decommissioning activities.						
			due to seepage / leaks of contaminants; solid waste; disturbance of wetland habitat where activities take place in wetlands or in close proximity; increase in invasive alien vegetation	contaminants, revegetate disturbed areas, rehabilitate wetlands, control invasive alien vegetation.	Backfill shaft and shape to be free-draining to limit ingress. No ponding of water on surface. Revegetate as soon as possible.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.				
			Decommissioning		Develop detailed method statements for any decommissioning work undertaken within wetlands or in close proximity to wetlands. Method statements to be reviewed by a wetland ecologist.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.				
			and removal of infrastructures could lead to mobilisation and transport of sediment into	Modify and control. Prevent mobilisation and transport of	Develop and implement a stormwater management plan for decommissioned areas that focusses on preventing sediment mobilisation and transport.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.				
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai	Wetlands	wetlands; water quality deterioration due to seepage / leaks of	sediment, remove waste and contaminants, revegetate	Re-vegetate bare soil areas as soon as possible after decommissioning. Utilise a seed mix of locally occurring indigenous grass species.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No disturbed footprints to remain bare of vegetation.				
	128 IS Portion 4	4	contaminants; solid waste; disturbance of wetland habitat where activities take place in wetlands or	disturbed areas, rehabilitate wetlands, control invasive alien vegetation.	Spills, leaks and any contaminated soils should be remediated on site if possible. If not possible, contaminated material should be removed from site and disposed off in an appropriate facility.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No contaminated soils to remain on site.				
			in close proximity; increase in invasive alien vegetation.		Develop and implement an alien vegetation management plan for all decommissioning sites.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No new infestations of invasive alien vegetation				



				DECOMMISSIO	NING PHASE - WETLANDS			
Project Activity	Location	Environmental Aspect Affected	Mitigation Type (Management Objective/ Outcome)		Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
					No solid waste to remain on site after decommissioning. All solid waste to be appropriately disposed of.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No solid waste remaining on site.
Si C North Downcast Ventilation Shaft Kr P	Shondoni Colliery - Farm		Decommissioning and removal of infrastructures could lead to mobilisation	Modify and control. Prevent mobilisation and	Install erosion protection measures as and where required to prevent erosion in receiving wetlands.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No sediment fans in adjacent wetlands and no erosion in adjacent wetlands.
	Kromdraai 128 IS Portion 4	Wetlands	and transport of sediment into wetlands; water quality deterioration	transport of sediment, remove waste and contaminants,	Develop and implement a wetland rehabilitation plan for any wetlands directly affected and degraded by decommissioning activities.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.
			due to seepage / leaks of contaminants; solid waste; disturbance of wetland habitat where activities take place in wetlands or in close proximity; increase in invasive alien vegetation.	eepage / ks ofrevegetate disturbed areas, rehabilitateants; solid turbance of d habitatrehabilitate invasive alien vegetation.vetlands or oroximity; in invasive getationset set antice	Backfill shaft and shape to be free-draining to limit ingress. No ponding of water on surface. Revegetate as soon as possible.	WUL, RQO, Best Practice Guidelines	Decommissioning and Closure Phases	No further degradation of wetland habitat.



		DECOMMISSIONING PHASE – AIR QUALITY											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved					
				SHONDON	NI SHAFT COMPLEX								
All activities	Shondoni Shaft Complex	Fugitive dust emissions.	Increased ground level particulate concentrations and dust fallout.	Minimise fugitive dust and gaseous emissions	Minimise disturbed areas. Keep material being handled moist. Installation of wind breaks to prevent wind erosion from disturbed areas. Re- vegetation of disturbed areas. Regular maintenance and servicing of construction vehicles.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non-residential limit of 1200 mg/m ² /day. PM ₁₀ , PM _{2.5} , NO ₂ , CO and SO ₂ concentrations in compliance with the SA NAAQS	Throughout the decommissioning phase	Compliance with SA NDCR and SA NAAQS.					
	SIMUNYE SHAFT COMPLEX												
All activities	Simunye Shaft Complex	Fugitive dust emissions.	Increased ground level particulate concentrations and dust fallout.	Minimise fugitive dust and gaseous emissions	Minimise disturbed areas. Keep material being handled moist. Installation of wind breaks to prevent wind erosion from disturbed areas. Re- vegetation of disturbed areas. Regular maintenance and servicing of construction vehicles.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non-residential limit of 1200 mg/m ² /day. PM ₁₀ , PM _{2.5} , NO ₂ , CO and SO ₂ concentrations in compliance with the SA NAAQS	Throughout the decommissioning phase	Compliance with SA NDCR and SA NAAQS.					
				PROPO	SED ACTIVITIES								
All activities	Shondoni Colliery – New Block 8 North Reserve	Fugitive dust emissions.	Increased ground level particulate concentrations and dust fallout.	Minimise fugitive dust and gaseous emissions	Minimise disturbed areas. Keep material being handled moist. Installation of wind breaks to prevent wind erosion from disturbed areas. Re- vegetation of disturbed areas. Regular maintenance and servicing of construction vehicles.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non-residential limit of 1200 mg/m ² /day. PM ₁₀ , PM _{2.5} , NO ₂ , CO and SO ₂ concentrations in compliance with the SA NAAQS	Throughout the decommissioning phase	Compliance with SA NDCR and SA NAAQS.					

Table 5.3(l): Decommissioning Phase Impact Management Measures Table – Air Quality



Table 5.3(m): Decommissioning Phase Impact Management Measures Table – Noise

No discernible noise or noise impacts will occur during the Decommissioning and Closure Phase.



			<u>y</u>	DECOMMISSIONI	NG PHASE - VISUALS					
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
	SHONDONI SHAFT COMPLEX									
All activities	Shondoni Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Activities that generate dust from decommissioning of site infrastructure and moving vehicles. Mining Activities that are subject to shaping of landforms. These activities include for instance stockpiles and dumps that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Restrict the extent of visible dust migration. Monitor and manage the vegetative rehabilitation of the Decommissioned Site. Manage Landshaping Activities. Manage Good Housekeeping.	Implement Dust Suppression according to the Dust Suppression Protocol. Implement Re- vegetation of the final rehabilitated land forms according to Re- Vegetation Protocol. Implement the Shaping of Landform Shaping Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Decommissioning Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape. Final Vegetative Cover to present similar to the surrounding landscape.		
				SIMUNYE SH	IAFT COMPLEX					
All activities	Simunye Shaft Complex	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Activities that generate dust from decommissioning of site infrastructure and moving vehicles. Mining Activities that are subject to shaping of landforms. These activities include for instance stockpiles and dumps that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Restrict the extent of visible dust migration. Monitor and manage the vegetative rehabilitation of the Decommissioned Site. Manage Landshaping Activities. Manage Good Housekeeping.	Implement Dust Suppression according to the Dust Suppression Protocol. Implement Re- vegetation of the final rehabilitated land forms according to Re- Vegetation Protocol. Implement the Shaping of Landforms according to Landform Shaping Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Decommissioning Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape. Final Vegetative Cover to present similar to the surrounding landscape.		

Table 5.3(n): Decommissioning Phase Impact Management Measures Table – Visuals



				DECOMMISSIONI	NG PHASE - VISUALS			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
				PROPOSEI	D ACTIVITIES			
All activities	Shondoni Colliery – New Block 8 North Reserve	Visibility. Visual Intrusion. Visual Exposure. Alterations to Landscape Morphology (Topography). Alterations to Landscape Morphology (Vegetation and Land Cover).	Activities that generate dust from decommissioning of site infrastructure and moving vehicles. Mining Activities that are subject to shaping of landforms. These activities include for instance stockpiles and dumps that could potentially create a Visual Intrusion in the landscape by taking on contrasting shapes to the natural landscape topography of the area.	Restrict the extent of visible dust migration. Monitor and manage the vegetative rehabilitation of the Decommissioned Site. Manage Landshaping Activities. Manage Good Housekeeping.	Implement Dust Suppression according to the Dust Suppression Protocol. Implement Re- vegetation of the final rehabilitated land forms according to Re- Vegetation Protocol. Implement the Shaping of Landforms according to Landform Shaping Protocol. Implement Good Housekeeping according to the Housekeeping Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Decommissioning Phase.	Visibility of activity to be acceptable in local and regional environment. Final Activity / Landforms / Infrastructure to present no Visual Intrusion in the surrounding Landscape. Visual Exposure of activity reduces to an acceptable level over distance: Long-range views. Final Landforms to present similar in shape and size to the surrounding landscape. Final Vegetative Cover to present similar to the surrounding landscape.



5.4 Post Closure Phase

Table 5.4(a): Post Closure Phase Impact Management Measures Table - Socio-Economic/Cultural

	POST CLOSURE PHASE – SOCIO-ECONOMIC/ CULTURAL											
Project Activity	Project Location Environmental Aspect Affected Impact Objective/ Outcome) Management		Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved						
	SHONDONI SHAFT COMPLEX											
Whole operation	Shondoni Colliery	Socio-Economic Aspects	Permanent Loss of	Mitigate risks related to potential subsidence	Post closure land (topographical) survey	MHSA Regulations Section 17	One year after closure; Detailed topographical survey every 5 years	All reported subsidence areas/ cases resolved				
-			iand		Rehabilitation of subsidence areas	Best Practice Guidelines with regards to maximising clean water runoff	Post Closure Phase	Subsided areas to be free-draining. No ponding.				



	POST CLOSURE PHASE - ARCHAEOLOGICAL/ HERITAGE												
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved					
				SHONDONI SHAFT C	OMPLEX								
Underground Mining	Shondoni Shaft Complex	Heritage Aspects	Potential Subsidence Impact on Graves	Remedy with reactive response on I&AP complaints	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons					
Underground Mining	Shondoni Shaft Complex	Heritage Aspects	Potential Subsidence Impact on Historical Remains	Remedy with reactive response on I&AP complaints	Documenting historical remains: Plan profile drawings, photographing and description	SAHRA Requirements (Approval/ Destruction Permit)	Documentation Process (4 months)	Positive community liaisons					
	SIMUNYE SHAFT COMPLEX												
Underground Mining	Simunye Shaft Complex	Heritage Aspects	Potential Subsidence Impact on Graves	Remedy with reactive response on I&AP complaints	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons					
Underground Mining	Shondoni Shaft Complex	Heritage Aspects	Potential Subsidence Impact on Historical Remains	Remedy with reactive response on I&AP complaints	Documenting historical remains: Plan profile drawings, photographing and description	SAHRA Requirements (Approval/ Destruction Permit)	Documentation Process (4 months)	Positive community liaisons					
				PROPOSED ACTIV	/ITIES								
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Heritage Aspects	Potential Subsidence Impact on Graves	Remedy with reactive response on I&AP complaints	Relocate possible graves	SAHRA Requirements (Approval/ Permits)	Exhumation and Relocation Process (approximately 3 months)	Positive community liaisons					
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Heritage Aspects	Potential Subsidence Impact on Historical Remains	Remedy with reactive response on I&AP complaints	Documenting historical remains: Plan profile drawings, photographing and description	SAHRA Requirements (Approval/ Destruction Permit)	Documentation Process (4 months)	Positive community liaisons					

Table 5.4(b): Post Closure Phase Impact Management Measures Table - Archaeological/ Heritage



POST CLOSURE PHASE -TOPOGRAPHY											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
	SHONDONI SHAFT COMPLEX										
Underground	Shondoni Shaft	Tonography	Areas prone to surface subsidence	Remedy areas	Detailed topographical survey every 5 years	MHSA Regulations Section 17		Subsided areas to			
Mining	Complex	Stability	as a result of underground mining	where subsidence has occurred	Ensure ground surface where subsidence has occurred is made free-draining	Best Practice Guidelines with regards to maximising clean water runoff	Post Closure Phase	be free-draining. No ponding.			
SIMUNYE SHAFT COMPLEX											
			Areas prone to surface subsidence	Remedy areas	Detailed topographical survey every 5 years	MHSA Regulations Section 17		Subsided areas to			
Mining	Complex	i opograpny: Stability	as a result of underground mining	where subsidence has occurred	Ensure ground surface where subsidence has occurred is made free-draining	Best Practice Guidelines with regards to maximising clean water runoff	Post Closure Phase	be free-draining. No ponding.			
			I	PROPOSED ACTIVITIE	S						
Underground Mining (New Block	Shondoni Colliery – New Block 8 North	Topography:	Areas prone to surface subsidence as a result of	Remedy areas where subsidence	Detailed topographical survey every 5 years Ensure ground	MHSA Regulations Section 17 Best Practice	Post Closure Phase	Subsided areas to			
8 North)	Reserve	Stability	underground mining	has occurred	surface where subsidence has occurred is made free-draining	Guidelines with regards to maximising clean water runoff		No ponding.			

Table 5.4(c): Post Closure Phase Impact Management Measures Table – Topography



	POST CLOSURE PHASE – SOILS, LAND CAPABILITY & LAND USE											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				SHONDONI SHAFT	COMPLEX							
Access Roads	Shondoni Shaft Complex	Soil fertility and vegetative cover - Additions of nutrients and possibly water to rehabilitated footprint area.	Addition of fertilizers is a possible pollutant/contaminant in large quantities. Movement of vehicle, animal and human impact on soil compaction, erosion, generation of dust and possible contamination (hydrocarbons).	Return affected areas to as close as possible the original condition. Monitor and remediate where necessary.	Monitor and Manage affected areas - Fence off sites, Use clean water and reduce animal, people and vehicle movement over rehabilitated sites.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil Management Plan for footprint of disturbance. Manage and maintain stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Continue until Closure Certificate authorised	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				
				SIMUNYE SHAFT (OMPLEX							
Access Roads	Simunye Shaft Complex	Soil fertility and vegetative cover - Additions of nutrients and possibly water to rehabilitated footprint area.	Addition of fertilizers is a possible pollutant/contaminant in large quantities. Movement of vehicle, animal and human impact on soil compaction, erosion, generation of dust and possible contamination (hydrocarbons).	Return affected areas to as close as possible the original condition. Monitor and remediate where necessary.	Monitor and Manage affected areas - Fence off sites, Use clean water and reduce animal, people and vehicle movement over rehabilitated sites.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil Management Plan for footprint of disturbance. Manage and maintain stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Continue until Closure Certificate authorised	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.				

Table 5.4(d): Post Closure Phase Impact Management Measures Table – Soils, Land Capability & Land Use



	POST CLOSURE PHASE – SOILS, LAND CAPABILITY & LAND USE										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
				PROPOSED ACTI	VITIES						
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Soil fertility and vegetative cover - Additions of nutrients and possibly water to rehabilitated footprint area.	Addition of fertilizers is a possible pollutant/contaminant in large quantities. Movement of vehicle, animal and human impact on soil compaction, erosion, generation of dust and possible contamination (hydrocarbons).	Return affected areas to as close as possible the original condition. Monitor and remediate where necessary.	Monitor and Manage affected areas - Fence off sites, Use clean water and reduce animal, people and vehicle movement over rehabilitated sites.	Chamber of Mines Guidelines and Best Practice Environmental Option (BPEO): Implement soil Management Plan for footprint of disturbance. Manage and maintain stormwater controls, erosion, compaction and contamination (dirty water runoff, hydrocarbon spillage and fertilizer concentrations).	Continue until Closure Certificate authorised	Best Practice Environmental Option (BPEO): Soil morphology, fertility and landscaping (free draining landform - no surface ponding) that allows for stable, self- sustaining vegetative growth and sustainable land cover.			



POST CLOSURE PHASE - GEOLOGY											
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
	SHONDONI SHAFT COMPLEX										
Underground Mining	Shondoni Shaft Complex	Geology: Lithology	Changes in overlying lithology due to potential pillar/roof failure within the underground workings	Control indirect impacts by identifying surface deformation areas	Survey department to update and provide draft / GIS department with detailed layouts of any deformation and subsidence on surface of roof and pillar failures	MHSA Regulations Section 17	As per approved Closure Plan	Detailed delineation of any surface deformations			
	SIMUNYE SHAFT COMPLEX										
Underground Mining	Simunye Shaft Complex	Geology: Lithology	Changes in overlying lithology due to potential pillar/roof failure within the underground workings	Control indirect impacts by identifying surface deformation areas	Survey department to update and provide draft / GIS department with detailed layouts of any deformation and subsidence on surface of roof and pillar failures	MHSA Regulations Section 17	As per approved Closure Plan	Detailed delineation of any surface deformations			
			I	PROPOSED ACTIVITIE	s						
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Geology: Lithology	Changes in overlying lithology due to potential pillar/roof failure within the underground workings	Control indirect impacts by identifying surface deformation areas	Survey department to update and provide draft / GIS department with detailed layouts of any deformation and subsidence on surface of roof and pillar failures	MHSA Regulations Section 17	As per approved Closure Plan	Detailed delineation of any surface deformations			

Table 5.4(e): Post Closure Phase Impact Management Measures Table - Geology



			POST CL	OSURE PHASE - GRO	UNDWATER						
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
	SHONDONI SHAFT COMPLEX										
Man and Material Shaft Infrastructure	Shondoni Shaft Complex	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre- mining groundwater levels.	The return of groundwater levels to pre- mining levels is a positive impact.	None	WUL	During the decommissioning phase	Final decommissioned groundwater levels			
Ventilation Shaft	Shondoni Shaft Complex	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre- mining groundwater levels.	The return of groundwater levels to pre- mining levels is a positive impact.	None	WUL	During the decommissioning phase	Final decommissioned groundwater levels			
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	The continuous influx of groundwater recharge into mine workings due to bord and pillar mining.	Manage the influx of normal groundwater recharge as part of the post closure phase water balance.	Manage the post- closure phase water balance responsibly to reduce water make and optimise underground storage space available, until all mining units are flooded.	Approved Mine Closure Plan	During the post closure phase	Groundwater quality to be complaint with resource quality objectives			
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	The decant of underground mine water to surface, after total flooding of mining units.	Prevent uncontrolled decant of underground mine water to surface.	If surface decant takes place, manipulate groundwater elevations in the total mining complex by pumping and treating polluted water on surface.	WUL Section 21(a), Taking water from a water resource.	During the post closure phase	Groundwater quality to be complaint with resource quality objectives			

Table 5.4(f): Post Closure Phase Impact Management Measures Table – Groundwater



			POST CI	OSURE PHASE - GRO	UNDWATER			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	Depletion of external users' groundwater resources and fountains due to bord and pillar mining activities.	Monitor all external users' boreholes for 1) yield and 2) quality deterioration, based on a structured monitoring protocol.	Supply external users with supplementary water in the cases where a mining- related impact can be proven.	Approved Closure Plan	During the post closure phase	Maintain external users supply.
Underground Mining	Shondoni Shaft Complex	Groundwater quantity and quality	Depletion of stream base flow due to sub-surface subsidence.	Surface rehabilitation of subsidence areas must reduce the reduction of stream base flow.	In the event that surface water streams or non-perennial streams is intersected by surface subsidence, rehabilitate the stream as soon as possible, to prevent further ingress of surface water to underground mining units.	Approved Closure Plan	During the post closure phase	Maintain a stable surface topography.
Underground Mining	Shondoni Shaft Complex	Groundwater quality	Inter-mine and inter- section flow of groundwater during the post closure phase.	Manage the overall water balance of the total Sasol Coal mining complex to prevent uncontrollable inter-mine flow to surrounding mines.	Measure water levels in the overall Sasol Coal reservoirs to ensure that no unit is over-utilized, and allowed to migrate or decant. Move between storage compartments (reservoirs) before inter-mine or inter- section flow takes place or pump excess water to surface here water can be desalinated.	Approved Closure Plan	During the post closure phase	Groundwater quality to be complaint with resource quality objectives



	POST CLOSURE PHASE - GROUNDWATER										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
Shondoni PCD	Shondoni Shaft Complex	Groundwater quantity and quality	Decommissioning of the Shondoni PCD.	To prevent the residual seepage of contaminated water from the Storm Water Pollution Control Dam (SWPCD) footprint entering the underlying aquifer units.	Prevent residual seepages and spillages of polluted water from the SWPCD footprint by rehabilitating the surface area to pre- mining surface- and topographical conditions.	Approved Closure Plan	During the post closure phase	Groundwater quality to be complaint with resource quality objectives			
Shondoni Incline PCD	Shondoni Shaft Complex	Groundwater quantity and quality	Decommissioning of the Shondoni incline PCD.	To prevent the residual seepage of contaminated water from the Incline PCD footprint entering the underlying aquifer units.	Prevent residual seepages and spillages of polluted water from the Incline PCD footprint by rehabilitating the surface area to pre- mining surface- and topographical conditions.	Approved Closure Plan	During the post closure phase	Groundwater quality to be complaint with resource quality objectives			
			S	IMUNYE SHAFT COM	PLEX						
Man and Material Shaft Infrastructure	Simunye Shaft Complex	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre- mining groundwater levels.	The return of groundwater levels to pre- mining levels is a positive impact.	None	WUL	During the decommissioning phase	Final decommissioned groundwater levels			
Ventilation Shaft	Simunye Shaft Complex	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre- mining groundwater levels.	The return of groundwater levels to pre- mining levels is a positive impact.	None	WUL	During the decommissioning phase	Final decommissioned groundwater levels			


			POST CL	OSURE PHASE - GRO	UNDWATER			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved
Underground Mining	Simunye Shaft Complex	Groundwater quantity and quality	The continuous influx of groundwater recharge into mine workings due to bord and pillar mining.	Manage the influx of normal groundwater recharge as part of the post closure phase water balance.	Manage the post- closure phase water balance responsibly to reduce water make and optimise underground storage space available, until all mining units are flooded.	Approved Mine Closure Plan	During the post closure phase	Groundwater quality to be complaint with resource quality objectives
Service Water Dam (Top)	Simunye Shaft Complex	Groundwater quantity and quality	The rehabilitated Service Water Dam (Top) footprint.	To prevent the residual seepage of contaminated water from the Service Water Dam (Top) footprint entering the underlying aquifer units.	Prevent residual seepages and spillages of polluted water from the Service Water Dam (Top) footprint by rehabilitating the surface area to pre- mining surface- and topographical conditions.	Approved Closure Plan	During the post closure phase	Groundwater quality to be complaint with resource quality objectives
Service Water Dam (Bottom)	Simunye Shaft Complex	Groundwater quantity and quality	The rehabilitated Service Water Dam (Bottom) footprint.	To prevent the residual seepage of contaminated water from the Service Water Dam (Bottom) footprint entering the underlying aquifer units.	Prevent residual seepages and spillages of polluted water from the Service Water Dam (Bottom) footprint by rehabilitating the surface area to pre- mining surface- and topographical conditions.	Approved Closure Plan	During the post closure phase	Groundwater quality to be complaint with resource quality objectives



			POST CL	OSURE PHASE - GRO	UNDWATER						
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
PROPOSED ACTIVITIES											
Underground Mining (Block 8 North)	Shondoni Colliery - Block 8 North Reserve	Groundwater quantity and quality	The continuous influx of groundwater recharge into mine workings due to bord and pillar mining.	Manage the influx of normal groundwater recharge as part of the post closure phase water balance.	Manage the post- closure phase water balance responsibly to reduce water make and optimise underground storage space available, until all mining units are flooded.	Approved Mine Closure Plan	During the post closure phase	Groundwater quality to be complaint with resource quality objectives			
West Upcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 11	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre- mining groundwater levels.	The return of groundwater levels to pre- mining levels is a positive impact.	None	WUL	During the decommissioning phase	Final decommissioned groundwater levels			
West Downcast Ventilation Shaft	Shondoni Colliery - Farm Brakspruit 359 IR Portion 8	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre- mining groundwater levels.	The return of groundwater levels to pre- mining levels is a positive impact.	None	WUL	During the decommissioning phase	Final decommissioned groundwater levels			
North Upcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre- mining groundwater levels.	The return of groundwater levels to pre- mining levels is a positive impact.	None	WUL	During the decommissioning phase	Final decommissioned groundwater levels			



POST CLOSURE PHASE - GROUNDWATER										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved		
North Downcast Ventilation Shaft	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Groundwater quantity and quality	Localized depletion of groundwater (if it occurred during the operational phase) will be reversed, and groundwater levels will start to return to pre- mining groundwater levels.	The return of groundwater levels to pre- mining levels is a positive impact.	None	WUL	During the decommissioning phase	Final decommissioned groundwater levels		



	POST CLOSURE PHASE – SURFACE WATER										
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
	SHONDONI SHAFT COMPLEX										
Underground Mining	Shondoni Shaft Complex	Surface Water quality	On-going Maintenance, Aftercare and Monitoring. Impact on water quality: potential decanting of acid mine drainage	Monitor and control by assessment of water quality every 5 to 10 years after mining ceases	The groundwater levels are to be kept below the aquifer decant levels at all times	As per GNR 704 and WUL conditions	After Rehabilitation/ Decommissioning until groundwater quality reach acceptable drinking water standard	Decant water quality to be complaint with resource quality objectives			
	SIMUNYE SHAFT COMPLEX										
Underground Mining	Simunye Shaft Complex	Surface Water quality	On-going Maintenance, Aftercare and Monitoring. Impact on water quality: potential decanting of acid mine drainage	Monitor and control by assessment of water quality every 5 to 10 years after mining ceases	The groundwater levels are to be kept below the aquifer decant levels at all times	As per GNR 704 and WUL conditions	After Rehabilitation/ Decommissioning until groundwater quality reach acceptable drinking water standard	Decant water quality to be complaint with resource quality objectives			
				PROPOSED ACTIVITIE	S						
Underground Mining (New Block 8 North)	Shondoni Colliery – New Block 8 North Reserve	Surface Water quality	On-going Maintenance, Aftercare and Monitoring. Impact on water quality: potential decanting of acid mine drainage	Monitor and control by assessment of water quality every 5 to 10 years after mining ceases	The groundwater levels are to be kept below the aquifer decant levels at all times	As per GNR 704 and WUL conditions	After Rehabilitation/ Decommissioning until groundwater quality reach acceptable drinking water standard	Decant water quality to be complaint with resource quality objectives			

Table 5.4(g): Post Closure Phase Impact Management Measures Table – Surface Water



POST CLOSURE PHASE – PLANT LIFE (FLORA)											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements / Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
SHONDONI SHAFT COMPLEX											
Security Fence & Access; Offices, Workshops & Changehouses; Internal Roads; Parking Areas; Man and Material Shaft; Infrastructure Ventilation Shaft; Potable Water Reservoir; Attenuation Dam; Storm Water Berms and Canals	Shondoni Shaft Complex	Habitats at sites that have been decommissioned	Direct loss of Natural Habitat in a listed Threatened Ecosystem (including CBAs)	Rehabilitation - restoration of original natural habitat	Annual audits of species richness and diversity of indigenous species as part of the post- closure monitoring program	NEMBA (10/2004)	Post Closure Phase	Restoration of 75% of species richness and diversity of original habitat (as determined at designated sample sites nearby)			
Fuel & Oil Storage; Explosives Off-Load Area, Coal storage (Surface Bunker); Coal Stockpile and Throw-Out Area; Stomedust Dump; Shondoni PCD; Shondoni Incline PCD; Surface Service Water Reservoir; Capital Yard; Iso Yard; Sewage Treatment Plant Oil and Silt Traps	Shondoni Shaft Complex	Habitats at sites that have been decommissioned	Direct loss of Natural Habitat in a listed Threatened Ecosystem (including CBAs)	Rehabilitation - restoration of original natural habitat	Annual audits of species richness and diversity of indigenous species as part of the post- closure monitoring program	NEMBA (10/2004)	Post Closure Phase	Restoration of 75% of species richness and diversity of original habitat (as determined at designated sample sites nearby)			
Conveyor System	Shondoni Shaft Complex	Habitats at sites that have been decommissioned	Direct loss of Natural Habitat in a listed Threatened Ecosystem (including CBAs)	Rehabilitation - restoration of original natural habitat	Annual audits of species richness and diversity of indigenous species as part of the post- closure monitoring program	NEMBA (10/2004)	Post Closure Phase	Restoration of 75% of species richness and diversity of original habitat (as determined at designated sample sites nearby)			
Underground Mining	Shondoni Shaft Complex	Areas of Natural Habitat	Degradation of Natural Habitat (listed Threatened Ecosystem and CBAs) through subsidence	Minimisation - control of alien plants in areas of subsidence	Inspection of any reported areas of subsidence to ensure that no bare soil has been exposed Control of any populations of invasive species by alien plant control team	NEMBA (10/2004)	Post Closure Phase	No established populations of alien invasive species in areas of subsidence until end of post closure phase.			

Table 5.4(h): Post Closure Phase Impact Management Measures Table - Plant Life (Flora)



	POST CLOSURE PHASE – PLANT LIFE (FLORA)											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements / Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Potable Water Supply System (Pipelines); Service Water Reticulation System (Pipelines), Electricity Supply	Shondoni Shaft Complex	Habitats at sites that have been decommissioned	Direct loss of Natural Habitat in a listed Threatened Ecosystem (including CBAs)	Rehabilitation - restoration of original natural habitat	Annual audits of species richness and diversity of indigenous species as part of the post- closure monitoring program	NEMBA (10/2004)	Post Closure Phase	Restoration of 75% of species richness and diversity of original habitat (as determined at designated sample sites nearby).				
	SIMUNYE SHAFT											
Security Fence and Access; Offices, Workshops and Changehouses Internal Roads and Parking Areas; Man and Material Shaft Infrastructure; Ventilation Shaft; Potable Water Reservoir; Attenuation Dam; Storm Water Berms and Canals; Service Water Dam (Top), Service Water Dam (Bottom)	Simunye Shaft Complex	Habitats at sites that have been decommissioned	Direct loss of Natural Habitat in a listed Threatened Ecosystem (including CBAs)	Rehabilitation restoration of original natural habitat	Annual audits of species richness and diversity of indigenous species as part of the post- closure monitoring program	NEMBA (10/2004)	Post Closure Phase	Restoration of 75% of species richness and diversity of original habitat (as determined at designated sample sites nearby)				
Fuel & Oil Storage Stonedust Dump Storage Yard (Temporary storage of hazardous waste) Storage Yard (Temporary storage of general, domestic and industrial waste), Sewage Treatment Plant, Oil and Silt Traps	Simunye Shaft Complex	Habitats at sites that have been decommissioned	Direct loss of Natural Habitat in a listed Threatened Ecosystem (including CBAs)	Rehabilitation - restoration of original natural habitat	Annual audits of species richness and diversity of indigenous species as part of the post- closure monitoring program	NEMBA (10/2004)	Post Closure Phase	Restoration of 75% of species richness and diversity of original habitat (as determined at designated sample sites nearby)				
Underground Mining	Simunye Shaft Complex	Areas of Natural Habitat	Degradation of Natural Habitat (listed Threatened Ecosystem and CBAs) through potential subsidence	Minimisation - control of alien plants in areas of potential subsidence	Inspection of any reported areas of subsidence to ensure that no bare soil has been exposed Control of any populations of invasive species by alien plant control team	NEMBA (10/2004)	Post Closure Phase	No established populations of alien invasive species in areas of subsidence until end of post closure phase.				



	POST CLOSURE PHASE – PLANT LIFE (FLORA)											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements / Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
Potable Water Supply System (Pipelines), Service Water Reticulation System (Pipelines), Electricity Supply	Simunye Shaft Complex	Habitats at sites that have been decommissioned	Direct loss of Natural Habitat in a listed Threatened Ecosystem (including CBAs)	Rehabilitation - restoration of original natural habitat	Annual audits of species richness and diversity of indigenous species as part of the post- closure monitoring program	NEMBA (10/2004)	Post Closure Phase	Restoration of 75% of species richness and diversity of original habitat (as determined at designated sample sites nearby)				
PROPOSED ACTIVITIES												
Underground Mining (Block 8 North)	Shondoni Colliery - Block 8 North Reserve	Areas of Natural Habitat	Degradation of Natural Habitat (listed Threatened Ecosystem and CBAs) through subsidence	Minimisation - control of alien plants in areas of subsidence	Inspection of any reported areas of subsidence to ensure that no bare soil has been exposed Control of any populations of invasive species by alien plant control team	NEMBA (10/2004)	Post Closure Phase	No established populations of alien invasive species in areas of subsidence until end of post closure phase.				
West Upcast and Downcast Ventilation Shafts	Shondoni Colliery - Farm Brakspruit 359 IR Portions 8 & 11	Cultivated Lands	Establishment of populations of invasive alien plant species	Minimisation - alien plant eradication and management	Annual audits of species richness and diversity of indigenous species as part of the post- closure monitoring program	NEMBA (10/2004)	Post Closure Phase	Restoration of 75% of species richness and diversity of original habitat (as determined at designated sample sites nearby)				
North Upcast and Downcast Ventilation Shafts	Shondoni Colliery - Farm Kromdraai 128 IS Portion 4	Habitats at sites that have been decommissioned	Direct loss of Natural Habitat in a listed Threatened Ecosystem	Rehabilitation (restoration of original natural habitat)	Annual audits of species richness and diversity of indigenous species as part of the post- closure monitoring program	NEMBA (10/2004)	Post Closure Phase	Restoration of 75% of species richness and diversity of original habitat (as determined at designated sample sites nearby)				



Table 5.4(i): Post Closure Phase Impact Management Measures Table – Animal Life (Fauna)

No potential impact expected on faunal assemblages during the Post Closure Phase.



	POST CLOSURE PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				SHC	ONDONI SHAFT COMPLEX							
	Water quality		Implement a wetland management and rehabilitation plan for the Waterval River and its tributaries to address mining impacts associated with Shondoni Colliery. This plan should consider risk of subsidence and decant post-closure	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Rehabilitate Sasol mining impacts on wetlands and watercourses according to water quality and flow objectives for the Waterval River						
		Prevent ingress and	Treat surplus mine water on surface to an acceptable standard to be released back into the environment. Provision must be made for treatment post-closure and potential decant well after operations have ceased.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Restore flows (and thereby also improve water quality) in the receiving Waterval River which has been affected by Sasol mining activities. Replace water in watercourses that has been lost to groundwater as a result of Sasol Mining activities. Manage possible decant.						
Underground Mining	Shondoni Shaft	Aquatic ecosystems	of biota due to reduced flows (subsidence) and declining water quality	subsidence, rehabilitate rivers and wetlands and improve flows and	Maintain partnerships with municipalities and townships to address water quality issues in the Waterval River.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Improve water quality in the receiving Waterval River				
	Complex		(decanting mine water) in the Waterval River	water quality in receiving watercourses	Conduct biomonitoring and water quality monitoring of Waterval River and its tributaries according to a biomonitoring Plan and a surface water and groundwater monitoring plan.	WUL, RQO	Operational, Decommissioning and Post Closure	for tion Standard to be achieved Standard to be achieved Standard to be achieved I, ning ure Rehabilitate Sasol mining impacts on wetlands and water courses according to water quality and flow objectives for the Waterval River Restore flows (and thereby also improve water quality) in the receiving Waterval River which has been affected by Sasol mining activities. Replace water in watercourses that has been lost to groundwater as a result of Sasol Mining activities. Manage possible decant. I, ning ure Improve water quality in the receiving Waterval River J Detect potential impacts to biodiversity timeously and implement appropriate management actions; ensure compliance with WUL and RQO I, ning ure No contamination of surface water by mine water				
					Monitor flows in the Waterval River and Grootspruit	RQO	Operational, Decommissioning and Post Closure					
					Possible decant points after closure should be identified at the commencement of the project and provision should be made for a comprehensive long-term plan to manage mine water during the operational phase and well beyond closure. This should include treatment options.	RQO, WUL, NEMBA	Operational, Decommissioning and Post Closure					

Table 5.4(j): Post Closure Phase Impact Management Measures Table – Aquatic Ecosystems



	POST CLOSURE PHASE – AQUATIC ECOSYSTEMS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				SI	MUNYE SHAFT COMPLEX							
					Implement a wetland management and rehabilitation plan for the Waterval River and its tributaries to address mining impacts associated with Shondoni Colliery. This plan should consider risk of subsidence and decant post-closure	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Rehabilitate Sasol mining impacts on wetlands and watercourses according to water quality and flow objectives for the Waterval River				
			Treat surplus mine water on surface to an acceptable standard to be released back into the environment. Provision must be made for treatment post-closure and potential decant well after operations have ceased.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Restore flows (and thereby also improve water quality) in the receiving Waterval River which has been affected by Sasol mining activities. Replace water in watercourses that has been lost to groundwater as a result of Sasol Mining activities. Manage possible decant.						
Underground	Simunye Shaft	Aquatic ecosystems	and flows in Waterval River and its	Prevent ingress and subsidence, rehabilitate rivers and wetlands	Prevent ingress and subsidence, rehabilitate rivers and wetlands	Prevent ingress and subsidence, rehabilitate rivers and wetlands	Prevent ingress and subsidence, rehabilitate rivers and wetlands	Prevent ingress and subsidence, rehabilitate rivers and wetlands	Maintain partnerships with municipalities and townships to address water quality issues in the Waterval River.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Improve water quality in the receiving Waterval River
Mining	Complex	1	ingress/subsidence and groundwater contamination.	and improve flows and water quality in receiving watercourses	Conduct biomonitoring and water quality monitoring of Waterval River and its tributaries according to a biomonitoring Plan and a surface water and groundwater monitoring plan.	WUL, RQO	Operational, Decommissioning and Post Closure	Detect potential impacts to biodiversity timeously and implement appropriate				
					Monitor flows in the Waterval River and Grootspruit	RQO	Operational, Decommissioning and Post Closure	compliance with WUL and RQO				
					Possible decant points after closure should be identified at the commencement of the project and provision should be made for a comprehensive long-term plan to manage mine water during the operational phase and well beyond closure. This should include treatment options.	RQO, WUL, NEMBA	Operational, Decommissioning and Post Closure	No contamination of surface water by mine water				



	POST CLOSURE PHASE - AQUATIC ECOSYSTEMS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
				F	PROPOSED ACTIVITIES						
					Implement a wetland management and rehabilitation plan for the Waterval River and its tributaries to address mining impacts associated with Shondoni Colliery. This plan should consider risk of subsidence and decant post-closure	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Rehabilitate Sasol mining impacts on wetlands and watercourses according to water quality and flow objectives for the Waterval River			
	Water quality	Prevent ingress and	Treat surplus mine water on surface to an acceptable standard to be released back into the environment. Provision must be made for treatment post-closure and potential decant well after operations have ceased.	face to an d back into be made for tial decant eased.	Operational, Decommissioning and Post Closure	Restore flows (and thereby also improve water quality) in the receiving Waterval River which has been affected by Sasol mining activities. Replace water in watercourses that has been lost to groundwater as a result of Sasol Mining activities. Manage possible decant.					
Underground Mining (Block 8 North)	Colliery - Block 8 North	Aquatic ecosystems	deterioration and loss of biota due to reduced flows in the Waterval	subsidence, rehabilitate rivers and wetlands and improve flows and	rivers and wetlands and improve flows and	Maintain partnerships with municipalities and townships to address water quality issues in the Waterval River.	WUL, RQO, Best Practice Guidelines	Operational, Decommissioning and Post Closure	Improve water quality in the receiving Waterval River		
	Reserve		River	receiving watercourses	Conduct biomonitoring and water quality monitoring of Waterval River and its tributaries according to a biomonitoring Plan and a surface water and groundwater monitoring plan.	WUL, RQO	Operational, Decommissioning and Post Closure	FonStandard to be achievedStandard to be achievedAngRehabilitate Sasol mining impacts on wetlands and water courses according to water quality and flow objectives for the Waterval RiverRestore flows (and thereby also improve water quality) in the receiving Waterval River which has been affected by Sasol mining activities. Replace water in watercourses that has been lost to groundwater as a result of Sasol Mining activities. Manage possible decant.ng reng reDetect potential impacts to biodiversity timeously and implement appropriate management actions; ensure compliance with WUL and RQO reng reng reNo contamination of surface water by mine water			
					Monitor flows in the Waterval River and Grootspruit	RQO	Operational, Decommissioning and Post Closure				
					Possible decant points after closure should be identified at the commencement of the project and provision should be made for a comprehensive long-term plan to manage mine water during the operational phase and well beyond closure. This should include treatment options.	RQO, WUL, NEMBA	Operational, Decommissioning and Post Closure				



	POST CLOSURE PHASE - WETLANDS										
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved			
				SHONDONI SHAFT (COMPLEX						
					Undertake a detailed subsidence risk assessment to identify areas likely to subside.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.			
			Subsidence leading to altered flow	Stop, control and	Undertake regular subsidence monitoring to identify new areas of subsidence and determine significance of subsided areas in terms of impact on surface flow and groundwater.	WUL, RQO, Best Practice Guidelines	Timeframe for Implementation Decommissioning & Post Closure a Decommissioning & Post Closure a	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.			
Underground Mining	Shondoni Shaft Complex	Wetlands	distribution and retention patterns in wetlands; reduced flow in wetlands leading to habitat degradation; water quality deterioration due to	modify. Stop uncontrolled decant and treat contaminated water prior to discharge. Limit subsidence, rehabilitate areas	Develop and implement subsidence rehabilitation plans. Any subsidence affecting wetlands must include a wetland ecologist in rehabilitation planning.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.			
			decant of contaminated mine water.	affected by subsidence.	Implement a water management strategy and treatment plan to prevent uncontrolled decant of contaminated mine water. Treated water to be discharged into the environment	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	No discharge or decant of contaminated mine water into the environment.			
					A detailed, catchment wide wetland and water monitoring strategy must be developed and implemented. Such a monitoring strategy must include flow monitoring in numerous locations across the catchment.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Detect potential impacts to biodiversity timeously and implement appropriate management actions			

Table 5.4(k): Post Closure Phase Impact Management Measures Table - Wetlands



	POST CLOSURE PHASE - WETLANDS											
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved				
				SIMUNYE SHAFT CO	OMPLEX							
					Undertake a detailed subsidence risk assessment to identify areas likely to subside.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.				
			Subsidence leading to altered flow distribution and	Stop, control and	Undertake regular subsidence monitoring to identify new areas of subsidence and determine significance of subsided areas in terms of impact on surface flow and groundwater.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.				
Underground Mining	Simunye Shaft Complex	Wetlands	distribution and retention patterns in wetlands; reduced flow in wetlands leading to habitat degradation; water quality detorication due to	modify. Stop uncontrolled decant and treat contaminated water prior to discharge. Limit subsidence, rehabilitate areas	Develop and implement subsidence rehabilitation plans. Any subsidence affecting wetlands must include a wetland ecologist in rehabilitation planning.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.				
			deterioration due to decant of contaminated mine water.	affected by subsidence.	Implement a water management strategy and treatment plan to prevent uncontrolled decant of contaminated mine water. Treated water to be discharged into the environment	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	No discharge or decant of contaminated mine water into the environment.				
					A detailed, catchment wide wetland and water monitoring strategy must be developed and implemented. Such a monitoring strategy must include flow monitoring in numerous locations across the catchment.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Detect potential impacts to biodiversity timeously and implement appropriate management actions				



	POST CLOSURE PHASE - WETLANDS								
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved	
				PROPOSED ACTIV	/ITIES				
					Undertake a detailed subsidence risk assessment to identify areas likely to subside.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.	
	Shondoni Colliery - Block 8 North Reserve	ui - Wetlands	Subsidence leading to altered flow	Stop, control and	Undertake regular subsidence monitoring to identify new areas of subsidence and determine significance of subsided areas in terms of impact on surface flow and determine significance of subsided areas in terms of impact on surface flow and	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.		
Underground Mining (New Block 8 North)			distribution and retention patterns in wetlands; reduced flow in wetlands leading to habitat degradation; water quality	modify. Stop uncontrolled decant and treat contaminated water prior to discharge. Limit subsidence, rehabilitate areas	Develop and implement subsidence rehabilitation plans. Any subsidence affecting wetlands must include a wetland ecologist in rehabilitation planning.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Identify any subsidence areas timeously and rehabilitate appropriately within 1year of occurrence.	
			decant of decant of contaminated mine water.	affected by subsidence.	Implement a water management strategy and treatment plan to prevent uncontrolled decant of contaminated mine water. Treated water to be discharged into the environment	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	No discharge or decant of contaminated mine water into the environment.	
					A detailed, catchment wide wetland and water monitoring strategy must be developed and implemented. Such a monitoring strategy must include flow monitoring in numerous locations across the catchment.	WUL, RQO, Best Practice Guidelines	Decommissioning & Post Closure	Detect potential impacts to biodiversity timeously and implement appropriate management actions	



	·			POST CLO	SURE – AIR QUAI	LITY			
Project Activity	Location	Environmental Aspect Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved	
SHONDONI SHAFT COMPLEX									
All activities	Shondoni Shaft Complex	Fugitive dust emissions during high wind speed events.	Increased ground level particulate concentrations and dust fallout during high wind speed events.	Minimise wind erosion potential.	Rehabilitation of all disturbed areas.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non-residential limit of 1200 mg/m ² /day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS	At decommissioning	Compliance with SA NDCR and SA NAAQS.	
				SIMUNY	E SHAFT COMPL	EX			
All activities	Simunye Shaft Complex	Fugitive dust emissions during high wind speed events.	Increased ground level particulate concentrations and dust fallout during high wind speed events.	Minimise wind erosion potential.	Rehabilitation of all disturbed areas.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non-residential limit of 1200 mg/m ² /day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS	At decommissioning	Compliance with SA NDCR and SA NAAQS.	
				PROP	OSED ACTIVITIES	3			
All activities	Shondoni Colliery – New Block 8 North Reserve	Fugitive dust emissions during high wind speed events.	Increased ground level particulate concentrations and dust fallout during high wind speed events.	Minimise wind erosion potential.	Rehabilitation of all disturbed areas.	Dust fallout at residential locations below NDCR residential limit of 600mg/m ² /day. Dust fallout at other locations below non-residential limit of 1200 mg/m ² /day. PM ₁₀ and PM _{2.5} concentrations in compliance with the SA NAAQS	At decommissioning	Compliance with SA NDCR and SA NAAQS.	

Table 5.4(I): Post Closure Phase Impact Management Measures Table – Air Quality



Table 5.4(m): Post Closure Phase Impact Management Measures Table - Noise

No discernible noise or noise impacts will occur during the Post Closure Phase.



				POST CLOSURE	E PHASE				
Project Activity	Location	Environmental Aspect (Receiving Environment) Affected	Potential Impact	Mitigation Type (Management Objective/ Outcome)	Management Measures	Legal Requirements/ Compliance with Standards	Timeframe for Implementation	Standard to be achieved	
	SHONDONI SHAFT COMPLEX								
All Activities	Shondoni Shaft Complex	Alterations to Landscape Morphology (Vegetation and Land Cover).	Successful re- vegetation of rehabilitated Post Closure Operations Site. Visual Impact reduced to Insignificant.	Monitor and manage the vegetative rehabilitation of the Decommissioned and Post Closure Site.	Implement Re- vegetation of the final rehabilitated land forms according to Re-Vegetation Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Post Closure Phase.	Final Vegetative Cover to present similar to the surrounding landscape.	
				SIMUNYE SHAFT	COMPLEX				
All Activities	Simunye Shaft Complex	Alterations to Landscape Morphology (Vegetation and Land Cover).	Successful re- vegetation of rehabilitated Post Closure Operations Site. Visual Impact reduced to Insignificant.	Monitor and manage the vegetative rehabilitation of the Decommissioned and Post Closure Site.	Implement Re- vegetation of the final rehabilitated land forms according to Re-Vegetation Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Post Closure Phase.	Final Vegetative Cover to present similar to the surrounding landscape.	
				PROPOSED ACT	TIVITIES				
All Activities	Shondoni Colliery – New Block 8 North Reserve	Alterations to Landscape Morphology (Vegetation and Land Cover).	Successful re- vegetation of rehabilitated Post Closure Operations Site. Visual Impact reduced to Insignificant.	Monitor and manage the vegetative rehabilitation of the Decommissioned and Post Closure Site.	Implement Re- vegetation of the final rehabilitated land forms according to Re-Vegetation Protocol.	VISUALS: Best Practice Guidelines. OTHER: Refer to Reports as mentioned in the Management Measures Column of this Table.	During Post Closure Phase.	Final Vegetative Cover to present similar to the surrounding landscape.	

Table 5.4(n): Post Closure Phase Impact Management Measures Table – Visuals



6. FINANCIAL PROVISION

Shondoni Colliery will develop a final rehabilitation, decommissioning and mine closure plan including financial provision to undertake rehabilitation and remediation of the adverse environmental impacts of mining as per the financial provision regulations of NEMA once this has been promulgated.

Currently Shondoni Colliery only assesses liability and makes provision for closure on an annual basis by means of the closure cost estimate model developed by an external service provider. Furthermore, Shondoni Colliery develops and updates a combined Rehabilitation Strategy and Implementation Plan (RSIP) as per the WUL (WUL 08/C12D/ACFGIJ/2027) conditions which informed the sections provided below.

6.1. CLOSURE OBJECTIVES AS ALIGNED WITH BASELINE ENVIRONMENT

The overall closure objectives as provided in the RSIP are as follows:

- Rehabilitate the mining area as far as practically possible to the original land use state, or as agreed with the authorities for mine closure;
- Ensure the safety of people and wildlife during the rehabilitation programme and post closure;
- Manage impacts on surface water and groundwater in accordance with the agreed rehabilitation objectives; and
- Manage impacts on the aesthetic appearance of the mine site in accordance with the agreed rehabilitation objectives.

6.2. CONFIRM CLOSURE OBJECTIVES AS CONSULTED WITH I&AP'S

The closure objectives and details provided in the following section of this draft EMPr were provided and consulted with Interested and Affected Parties (I&AP's) during the EIA Phase of this project. The I&AP's were provided with access to the full draft EIAR and EMPr and were given 30 days for review and comment.

Comments received throughout the Stakeholder Engagement Process (SEP) were continually attended to and responses to issues and comments are documented in the formal Issues and Response Register – refer to section 7.3.4 of the draft EIAR and APPENDIX 7(B) of the draft EIAR.

6.3. REHABILITATION PROGRAMME

The rehabilitation programme relayed below provides general rehabilitation principals which are described to enable financial provisions to be developed in terms of the NEMA financial provisions. The progressive review of the rehabilitation programme should develop practical, reasonable and achievable closure objectives and progressive rehabilitation to reduce long-term water management liabilities.

The main objectives for rehabilitation and closure are to restore the pre-mining potential of the land, where possible. In terms of rehabilitation post closure, the final land use at all the shafts will be low level grazing and/or wilderness.



Key aspects of the programme to reduce potential impacts on the water resource are as follows:

- Areas occupied by infrastructure (plant, offices, other) will be restored to pre-mining land capabilities, as far as practical, and as agreed with the authorities and stakeholders;
- Rehabilitation standards will be such that runoff from rehabilitated areas can be regarded as being of limited material risk to the receiving water resources, as far as practical, and as agreed with the authorities and stakeholders;
- Rehabilitation standards will be such that infiltration through disturbed strata to groundwater should pose a limited material risk to the groundwater resources, as far as practical, and as agreed with the authorities and stakeholders;
- There will be concurrent rehabilitation of disturbed and/or contaminated areas so that residual contamination poses a limited material risk to the receiving water resources, as far as practical, as agreed with the authorities and stakeholders (e.g. oil spills and silt loads from eroded areas) remaining at closure; and
- Post closure environmental monitoring will take place until it can be confirmed that the closure objectives have been met i.e. groundwater infiltration and runoff can be regarded as posing little material risk to human health or the environment.

6.3.1. General Rehabilitation Principles

Remediation may include the following principles, which may be refined into specific guidance through further investigation to determine what is reasonable and achievable for Shondoni Colliery, as the mine progresses through operation towards closure:

- Level or grade disturbed areas to a slope not greater than 1:3 wherever the natural topography and space constraints allow;
- Rip compacted areas to a depth of 200 mm and apply fertilizer/growth media if required;
- Revegetate with indigenous species appropriate for the area and that are consistent with post-mining land use and controlling erosion. In areas where topography requires a slope steeper than 1:5, grasses that stabilise the slopes and reduce erosion are recommended;
- Vegetation establishment may be monitored and corrective measures, for example removal of alien vegetation and noxious weeds, fertilizer application, reseeding, additional erosion control measures etc., may be applied; and
- Maintenance of rehabilitated areas, including any additional erosion control measures, may continue until the vegetation cover has been established and can be shown to be stable and self- sustaining.

6.3.2. Shafts and Underground Workings

The following rehabilitation actions applies for mine infrastructure areas no longer required:

- Identifying potential post-mining uses for current mine buildings. The administration building could be converted to an alternative use, as required by Section 44 of the MPRDA;
- Buildings considered not suitable for post-mining use or those that may pose safety or health risks may be demolished;
- Building foundations may be removed to a depth of 0.5 m;
- Building rubble, overburden material and ash may be used to fill the shaft voids;
- All access to underground workings will be sealed in accordance with the Department of Mineral Resources and Energy (DMRE) and legal requirements;
- Surface infrastructure associated to the underground workings will be demolished as far as possible;



- Sealed entrances will be capped with soil and rehabilitated, as per the rehabilitation plan;
- Entrances should be shaped and rehabilitated, as far as possible, to form part of the surrounding landscape, while maintaining a safe and stable structure;
- Sites that have been contaminated by the associated mining infrastructure or processes may be assessed, and samples may be analysed, and site-specific actions may be taken to remedy these impacts if soil contamination is detected. Contaminated soil may be removed and disposed of according to the waste classification, where no remedy is possible;
- Mobile infrastructure may be sold where possible or demolished;
- Land that has been exposed or disturbed due to infrastructure demolition may be top soiled and rehabilitated according to the rehabilitation plan;
- All haul roads and access roads with associated watercourse crossings, may remain intact where possible, and the liability may be transferred to the post-mining land users; and
- Electrical supply and related infrastructure may remain as an Eskom asset.

6.3.3. Roads, Laydown and Parking Areas

At the time of closure, these areas may be rehabilitated in the following way:

- Removal of all signage, fencing, shade structures, traffic barriers, etc;
- All 'hard top' surfaces to be ripped and bitumen removed along with any culverts and concrete structures;
- Where possible maintain existing vegetation;
- All concrete-lined drainage channels and sumps to be broken up and removed;
- All potentially contaminated soils are to be identified and demarcated for later remediation; and
- These areas may be suitably ripped, topsoil and revegetated.

6.3.4. River Crossings

After decommissioning, demolition and maintenance work the following may be undertaken:

- All unnecessary equipment, debris etc., may be removed from the site;
- The river banks may be stabilised;
- All disturbed areas may be revegetated with an indigenous seed mix (chosen in consultation with an indigenous plant expert), ensuring that during rehabilitation only indigenous shrubs, trees and grasses are used in restoring the biodiversity;
- Alien vegetation may be controlled by removal, until revegetation with indigenous plants have been established;
- Erosion and siltation of the watercourse may be prevented by managing the vegetation of the surrounding catchment. Where required additional erosion protection measures may be put in place, for example, gabion protection; and
- These areas may be regularly inspected (at least annually) after closure till self-sustaining. Corrective measures to achieve sustained rehabilitation may be implemented as required.

6.3.5. Waste Area Facilities

Waste management areas may be rehabilitated in the following way:

- Remove all facilities and equipment from the site;
- The surface may be profiled to mimic surrounding topography and be free draining;



- A deep rip of 500 mm may be undertaken across the footprint of the waste site;
- Soil may be placed across the site using a dozer to a thickness of 300 mm then a shallow rip using a line of 250 mm may be used to loosen compaction;
- Appropriate soil ameliorants may be added, based on soil test results, to assist with the establishment of vegetation on the footprint;
- Alien vegetation and noxious weeds may be removed until the indigenous vegetation cover is adequate to provide natural weed control;
- The potential for erosion by wind and water may be reduced; and
- Revegetated areas may be monitored and maintained until the vegetation cover has been established and can be shown to be self-sustaining.

6.3.6. Workshops, Offices and other Surface Infrastructure

The areas may be rehabilitated in the following way:

- Mine surface infrastructure may either be demolished, or an alternative use may be decided on.
- All power and water services to be disconnected and certified as safe prior to commencement of any demolition works.
- All remaining inert equipment and demolition debris may be placed in the base of the nearest shaft.
- Salvageable equipment may be removed and transported offsite prior to the commencement of demolition.
- All fittings, fixtures and equipment within buildings may be dismantled and removed to designated temporary disposal yards.
- All tanks, pipes and sumps containing hydrocarbons to be flushed or emptied prior to removal to ensure no hydrocarbon/chemical residue remains.
- All above-ground electrical, water and other service infrastructure and equipment to be stored in the designated temporary salvage yards.
- All pond liners to be removed for disposal in designated landfills.
- Electrical, water and other services that are more than 400 mm below ground surface may remain.
- All pipes and structures deeper than 400 mm need to be sealed to prevent possible ingress and ponding of water.
- Concrete slabs and footings may be removed to a depth of 500 mm below ground surface. This concrete (and metal) may be broken up and disposed of in the shaft.
- All concrete below 500 mm depth may remain underground with the invert of all structures broken/sealed to prevent possible ingress and ponding of water.
- Soils beneath the plant, storage tanks and chemical storage areas may be sampled. Any contaminated soils found may be adequately addressed.
- All subsurface cavities such as reinforced concrete tunnels under stockpiles and septic tanks may be backfilled.
- All excavations resulting from demolition of plant, buildings, roads, conveyor platforms, etc. and earth structures may be left in a safe manner.
- All telecommunication towers and dishes to be dismantled and removed.
- These areas may be suitably ripped, top-soiled and revegetated.



6.4. REHABILITATION PROGRAMME COMPATIBILITY WITH CLOSURE OBJECTIVES

As mentioned in the sections above, Shondoni Colliery will develop a final rehabilitation, decommissioning and mine closure plan including financial provision to undertake rehabilitation and remediation of the adverse environmental impacts of mining as per the financial provision regulations of NEMA once this has been promulgated.

Currently Shondoni Colliery only assesses liability and makes provision for closure on an annual basis by means of the closure cost estimate model developed by an external service provider. Furthermore, Shondoni Colliery develops and updates a combined Rehabilitation Strategy and Implementation Plan (RSIP) as per the WUL (WUL 08/C12D/ACFGIJ/2027) conditions.

The RSIP, which is updated annually, outlines requirements and considerations to the rehabilitation programme, to ultimately inform a closure plan as well as provide ongoing rehabilitation actions to reach the closure objectives.

These actions proposed are to be implemented during the operational phase as progressive and concurrent rehabilitation, which will reduce the financial, environmental and social liabilities of the decommissioning and closure phase.

6.5. CALCULATION OF QUANTUM REQUIRED TO MANAGE AND REHABILITATE

Sasol Mining appointed an independent consultant (Jones and Wagener) to develop their mine closure cost estimate model. This model was initially developed in 2013 and has since been updated annually by adding new infrastructure and removing demolished infrastructure from the cost estimate as the case may be at the individual coal mining operations, i.e. Business Units. This cost estimate serves as the financial provisioning and is submitted to the DMRE on an annual basis.

In terms of the financial provision information provided in this section of the EIAR, reference will only be made to the Shondoni Colliery closure cost estimate which relates to the current infrastructure at the Shondoni Shaft Complex, infrastructure at the Simunye Shaft Complex and the proposed ventilation shafts.

6.5.1. Quantum Required to Manage and Rehabilitate the Environment in Respect of Rehabilitation

Table 6.5.1(a) relays figures relevant to Shondoni Colliery and not the entire Mining Right Area (MP 30/5/1/2/3/2/1/138 MR). These amounts provided in terms of the Shondoni and Simunye Shaft Complexes were derived from the Financial Year (FY) 2020 cost estimate report that was submitted to the DMRE.

The amount provided for the proposed ventilation shafts was calculated on the same basis, details provided in the following sections (refer to Table 6.5.1(b)). Take note that the grand total provided for the proposed ventilation shafts are inclusive of **both** the proposed northern and western shaft complexes; each consisting of an up- and downcast shaft.



Description	Total
Shondoni Shaft Complex	R 69 577 929.00
Simunye Shaft Complex	R 17 305 892.00
Proposed Ventilation Shafts (Northern and Western Ventilation Shaft Complex)	R 4877793.12
Grand Total for Shondoni Colliery	R 91 761 614.12

 Table 6.5.1(a): Decommissioning and Closure Cost Estimate FY20 – Shondoni Colliery

6.5.2. Determination of the Quantum

6.5.2.1. General Background

As part of the initial closure cost study conducted by the independent consultant (Jones and Wagener) in 2014, an itemised register was compiled for all the applicable infrastructure deemed to be demolished as identified in the approved EMPr.

The purpose of the itemised register was to provide a reference system between the actual individual infrastructures on site and the individual infrastructure's respective closure cost in the closure cost estimate, adding value to asset management and making it possible to add new items to the estimate or to remove the costs associated with items once they are demolished.

Site visits were carried out on foot by civil engineers and all items to be demolished were investigated. Photographic reports were compiled indicating the relevant aspects of each item investigated during the site visits. During these site visits, the size, nature and type of the item were identified and determined.

Layout drawings of a specific site indicated the location, size, and extent of most of the relevant items. Drawings were used to measure the length or area of various infrastructures. Where applicable, dimensions and quantities were determined from as built drawings.

Calculations were based on the measurements of the relevant items determined either on site or from the layout drawings. A spreadsheet-based calculator was developed by Jones and Wagener for the estimation of the volume of building rubble resulting from the demolition of brick buildings. Basic measurements and assumptions are entered into the spreadsheet and the estimated volume of building rubble is determined. Assumptions include the dimensions of foundations, which are not visible and therefore cannot be measured, and a factor for the bulking of brick and concrete, i.e. the amount by which the in situ volume increases when it is broken down.

The closure cost estimate was updated on an annual basis following the initial assessment by adding new infrastructure and removing demolished infrastructure from the cost estimate. Some years the producer price index (PPI) was applied to the previous year's rates to obtain current rates and other years the rates adjustment was made using rates obtained from contractors.



Inventory Item	DMRE Quantum	Work Subsection Description	Work Item Description	Notes	Unit	Qty FY21	Rate FY21	Amount FY21	FY21 P&G's
Ventilation downcast shaft ventilation duct	07 - Sealing of shafts, adits and inclines	120.1 - Rehabilitate shafts	Concrete plug (unreinforced)	Diameter 7.5m (From drawing), assume 8m deep plug	m ³	353.43	R 2 200.00	R 777 543.80	R 155 508.76
Ventilation downcast shaft ventilation duct	02(A) - Demolition of steel buildings and structures	10.1 - Demolish buildings and structures	Various steel structures	Total mass of steel calculated according to provided drawing	t	30.74	R 1 000.00	R 30 735.00	R 6 147.00
Ventilation downcast shaft ventilation duct	02(B) - Demolition of reinforced concrete buildings and structures	10.1 - Demolish buildings and structures	Reinforced concrete floor slabs	Assumed 11.5 by 19.5 slab 350mm thick	m ³	78.49	R 560.00	R 43 953.00	R 8 790.60
Ventilation downcast shaft area	10 - General surface rehabilitation, including grassing of all denuded areas	110.2 - Establish vegetation	Supply, deliver and spread topsoil from borrow pit	Only topsoil under infrastructure footprints	m ³	67.28	R 74.50	R 5 012.00	R 1 002.40
Ventilation downcast shaft area	10 - General surface rehabilitation, including grassing of all denuded areas	110.2 - Establish vegetation	Fertilize areas	Entire Downcast shaft complex surface (KML file) 9696m2.	m ²	9696.00	R 1.56	R 15 164.00	R 3 032.80
Ventilation downcast shaft area	10 - General surface rehabilitation, including grassing of all denuded areas	110.2 - Establish vegetation	Vegetate areas - seed mix with slopes less than 1:5	Entire Downcast shaft complex surface (KML file) 9696m2.	m ²	9696.00	R 1.91	R 18 533.00	R 3 706.60
Ventilation downcast shaft area	14 - 2 to 3 years of maintenance and aftercare	140.1 - Post closure maintenance	Maintenance cost fully inclusive per hectare per year	Entire Downcast shaft complex surface (KML file) 9696m2. 5 years maintenance	ha.yr	4.85	R 2 578.93	R 12 503.00	R 2 500.60
Ventilation downcast shaft area	12 - Fencing	20.1 - Demolish fencing, walls and gates	2,4 m High security fence complete	Fence perimeter from Google Earth 387m	m	387.00	R 42.85	R 16 583.00	R 3 316.60
Ventilation upcast shaft ventilation duct	07 - Sealing of shafts, adits and inclines	120.1 - Rehabilitate shafts	Concrete plug (unreinforced)	Assume 7.45m diameter 8m deep	m ³	348.73	R 2 200.00	R 767 211.00	R 153 442.20
Ventilation upcast shaft ventilation duct	02(A) - Demolition of steel buildings and structures	10.1 - Demolish buildings and structures	Various steel structures	Estimated off other ventilation shaft	t	82.00	R 1 000.00	R 82 000.00	R 16 400.00
Ventilation upcast shaft ventilation duct	02(B) - Demolition of reinforced concrete buildings and structures	10.1 - Demolish buildings and structures	Reinforced concrete foundations	Estimated off other ventilation shaft	m ³	130.00	R 780.00	R 101 400.00	R 20 280.00
Ventilation upcast shaft ventilation duct	02(C) - Demolition of brick office buildings and structures	10.1 - Demolish buildings and structures	Double storey buildings: brick walls and metal	Assumed same as other motor houses	m ²	45.09	R 671.05	R 30 257.00	R 6 051.40

Table 6.5.1(b): Cost Estimate associated with the Decommissioning of the proposed Ventilation Shafts



Inventory Item	DMRE Quantum	Work Subsection Description	Work Item Description	Notes	Unit	Qty FY21	Rate FY21	Amount FY21	FY21 P&G's
			sheet roofing on timber structures						
Ventilation upcast shaft area	12 - Fencing	20.1 - Demolish fencing, walls and gates	2,4 m High security fence complete	Fence estimated 547m	m	547.00	R 42.85	R 23 438.00	R 4 687.60
Ventilation upcast shaft area	10 - General surface rehabilitation, including grassing of all denuded areas	110.2 - Establish vegetation	Supply, deliver and spread topsoil from borrow pit	Only topsoil underneath buildings and concrete footprints.	m ³	332.28	R 74.50	R 24 755.00	R 4 951.00
Ventilation upcast shaft area	10 - General surface rehabilitation, including grassing of all denuded areas	110.2 - Establish vegetation	Fertilize areas	Fertilize whole area	m²	17488.00	R 1.56	R 27 349.00	R 5 469.80
Ventilation upcast shaft area	10 - General surface rehabilitation, including grassing of all denuded areas	110.2 - Establish vegetation	Vegetate areas - seed mix with slopes less than 1:5	Vegetate whole area	m ²	17488.00	R 1.91	R 33 427.00	R 6 685.40
Ventilation upcast shaft area	14 - 2 to 3 years of maintenance and aftercare	140.1 - Post closure maintenance	Maintenance cost fully inclusive per hectare per year	5 year maintenance over whole area	ha.yr	8.74	R 2 578.93	R 22 550.00	R 4 510.00
					S	ub Total 1 (fo	r one ventilatio	on shaft complex)	R 2032413.80
				P&G's of Sub Total 1 (for one ventilation shaft complex)					R 406 482.76
						Sub Total 2 ((for one ventilat	ion shaft complex)	R 2438896.56
				Grand Total for tw	vo (Northe	rn and Weste	rn) Ventilation	Shaft Complexes	R 4877793.12

Sub Total 2 provides the costs associated with one proposed ventilation shaft complex; consisting of an individual down and upcast structure. This amount was multiplied by two and the amount relayed as the Grand Total is the cost estimate provided to decommission and rehabilitate both the northern and western ventilation shaft complexes proposed for Shondoni Colliery. No detailed designs are yet available for these structures and the amounts provided are in line with similar structures at other Sasol Mining Business Units.



Most of the closure cost components is related to the demolition of infrastructure, dismantling of services and closure of shafts related to underground mining. Costs for the consultant fees for a closure application have been added per mining right. Where more than one operation is included in the right, the costs were divided between the Business Units that would be operational up and till the closure applications are required.

Post-closure maintenance costs (not latent risks) are limited to the corrective actions required for minor surface erosion and the establishment and maintenance of vegetation over a period of 5 years after closure. Other post-closure impacts (or referred to as latent/environmental risks), for example groundwater decant, have not been determined and would require further specialist studies to establish what management option is required.

The cost associated with longer-term maintenance will be managed under the Head of Mine Closure's operational budget. The funds required for closure provision does not include the cost for items which cannot be determined prior to a feasibility stage design/assessment, i.e. subsidence, post closure risks and social aspects.

6.5.2.2. Closure Cost Methodology

In terms of the applicable guideline referred to the Quantum for Closure document (DME, January 2005) is the official guideline document as contemplated in Regulation 54(1) to the MPRDA (2002).

The purpose of the guideline is to enable DMRE to adequately evaluate/review the quantum for financial provision submitted by the mining industry.

The guideline provides details on closure components methodologies and defines a master rate for each closure component which is based on the generally accepted closure methods.

The master rate is then multiplied by a factor as well as various weighting factors, depending on the risk class category of the mine.

According to the guideline, the master rates published in Section B of the guideline, must be updated on an annual basis, based on Consumer Price Index (CPIX) or a similar approved method. These rates were not used in the above mentioned mine closure estimate as the rates were deemed generic in nature and generalised to cover the whole country, and not region specific.

It is stated in the DMRE Guideline Document that "Site specific conditions must also be considered...". Furthermore, the master rates are not defined to the level of detail as was desired for this cost estimate assessment.

The DMRE's Quantum for Closure guideline provides a step-by-step approach on how to determine the financial provision cost for closure. "Figure B1" below indicates the process and possible routes to be followed by the DMRE in their assessment of the quantum submitted.





Figure 6.5.2.2(a): DMRE's Figure B.1 - Process Flow for Closure Assessment



According to the above process flow diagram (Figure 6.5.2.2(a)), once the mineral processes and saleable by-products, the risk class and area sensitivity have been determined, the mine can then be classified as either a Class A, B or C mine.

Three routes can be followed by DMRE to determine whether the quantum for closure submitted is acceptable, i.e.:

- Route 1 Based on the availability of extensive information;
- Route 2 Based on limited information available; or
- Route 3 Based on insufficient information available

Section 4.1 in the guideline described the methods that can be used based on the level of information available to carry out the closure cost assessments. Identify the information that is available for the mining operation. This will be either extensive or limited:

- Extensive information will include the following:
 - An approved EMPr as contemplated in Section 39 of the MPRDA, or an EMPr that is in the process of being approved or amended;
 - A detailed Closure Plan, based on the EMPr, that covers relevant aspects of demolition and rehabilitation of the mining operation; and
 - A detailed breakdown of the costs envisaged for rehabilitation and closure, signed off by a competent person.
- Limited information is a level of information that is less comprehensive, in any way, than that given above. Extensive information must be provided by the mine and must be signed-off by a competent person. In instances where extensive information is available, the following three options are available:
 - **Option 1:** Accept the quantum provided for the financial provision, or
 - **Option 2:** Commission an independent review of the quantum of financial provision provided, using a competent person, or
 - **Option 3:** Follow a "rule-based" approach by proceeding with the procedure described in the Quantum for Closure guideline. In instances where limited information is available, the "rule-based" approach must be followed."

The level of information available at all the Sasol Mining shaft complexes can be considered as extensive because EMPr's are approved by the DMRE.

In terms of the Preliminary and General (P&G's) and Contingency items, the DMRE Quantum for Closure guideline does not define these cost items. However, in the template given in Table B.10 these items are allowed for. Where the total quantum is above R100m, 6% of the total value is added to allow for Preliminary and General cost (P&Gs) and for smaller totals a value of 12% is used. Contingencies to the value of 10% of the total quantum before P&Gs are added.

Thus, for projects with a quantum value in excess of R100m the total additional cost is 16% and for smaller project 22%. Experience in mine rehabilitation has shown that P&G and contingency costs generally amount to at least 20% of the total costs. For the purpose of this provision a percentage of 12% is assigned to P&G costs and 8% is assigned to contingency costs. The minimum DMRE requirements were thus used upon direction of Sasol Mining.



6.5.2.3. General Assumptions

There are several general assumptions applicable to the abovementioned Closure Cost estimate model, but in terms of the proposed ventilation shafts, the following is of importance:

• The vertical and inclined shafts will be available for dumping of building rubble. Drawings of the shaft closure were supplied by Sasol Mining. Calculations were carried out for each shaft at the various complexes to determine the available space for disposal of rubble. The disposal of rubble into the shafts was included in the rate of demolition of each item (within freehaul distance of 1 km). The transportation of any excess materials which could not be accommodated in the shafts was measured under the overhaul item for disposal at a designated site, assumed to be within 5 km radius of the site. The cost of overhaul is reflected in the respective detailed closure cost estimate for each relevant shaft complex. Note that the cost of opening, licensing or purchasing and subsequent rehabilitation of waste disposal facilities for this purpose is not included in this estimate and would require more detailed assessment. The bottom portions of vertical shafts are assumed to be filled in before demolishing of any shaft infrastructure. The volume available for backfill with rubble is indicated in Figure 6.5.2.3(a).



Figure 6.5.2.3(a): Volume available for backfill



6.6. CONFIRMATION OF FINANCIAL PROVISIONING

Confirmation of the financial provisioning/ funds available is provided in APPENDIX 19(A) of the EIAR.



7. COMPLIANCE MONITORING AND PERFORMANCE ASSESSMENT

The EIA Regulations require that a Formal Compliance Monitoring and Performance Assessment Programme be developed to assess compliance with the Environmental Impact Management Actions prescribed in the EMPr.

These requirements are listed in Appendix 4 of the EIA Regulations, GNR 326 of 07 April 2017 (as amended), and are as follows:

- The method of monitoring the implementation of the impact management actions described in Chapter 5 of the EMP;
- The frequency of monitoring the implementation of the impact management actions described in Chapter 5 of the EMP;
- An indication of the persons who will be responsible for the implementation of the impact management actions;
- The time periods within which the impact management actions contemplated in Chapter 5 must be implemented;
- The mechanism for monitoring compliance with the impact management actions contemplated in Chapter 5;
- A programme for reporting on compliance, taking into consideration the requirements as prescribed in the regulations.

The DMRE template for the compilation of an EMPr requires the information to be supplied in Tabular format. Table 7(a) was compiled in compliance with the above requirements as well as the DMRE guideline document.

It should be noted that monitoring programmes/plans have been developed (where relevant and applicable) for all the environmental components assessed for this project:

- Socio-Cultural and Socio-Economic Aspects
- Archaeology, Heritage and Palaeontology
- Topography
- Soils, Land Capability and Land Use
- Geology and Geochemistry
- Groundwater
- Surface Water
- Terrestrial Ecology (Plant Life & Animal Life)
- Aquatic Ecosystems
- Wetlands
- Air Quality
- Noise
- Visual Aspects



These monitoring plans provide details proposed to monitor the impacts associated with the project and efficiency of management measures proposed. These plans contain information related to the following aspects:

- Monitoring localities
- Monitoring procedures
- Relevant standards for monitoring
- Monitoring frequencies
- Data capture protocols
- Reporting
- Standard operating procedures for non-compliance

It should be noted that Material Compliance Monitoring Programmes have been developed for all the environmental components assesses for this project in support of the Water Use Licence Application to be lodged for Shondoni Colliery. This information and detailed descriptions will be captured in the supporting IWWMP to be submitted to the DWS.

Material Compliance Monitoring Programmes was developed for the Surface Water, Groundwater, Wetlands and Aquatic Ecosystems environmental components. Details of these programmes are not relayed in the table provided in this section, but rather the necessary reference is made thereof.

Table 7(a) consists of the following Columns:

- Environmental Component
- Source Activity (ies)
- Reference to Potential Impact
- Functional Requirements for Monitoring
- Frequency of Monitoring Implementation
- Reporting Frequency
- Responsible Person
- Time period for implementation

Auditing of compliance with the environmental authorisation/ EMPr (and monitoring of this auditing) must adhere to regulation 34 of the EIA Regulations of 2017 (as amended).



Environmental Component	Source Activity (ies) at Shondoni Colliery	Impacts Requiring Monitoring	Functional Requirements for Monitoring	Frequency of Monitoring Implementation	Reporting Frequency	Responsible Person	Time Period for Implementation
Socio-Cultural and Socio-Economic Aspects	Operations of Shondoni Colliery	Impacts associated with population influx, Nuisance factors, Impact on property values/ loss of land	Establishment of a complaints register.	Register: Continuous	Monthly feedback on complaints register.	Project Manager	Construction phase (proposed ventilation shafts), operational phase and throughout decommissioning phase
		Impacts on community safety, Local employment and income opportunities (loss of jobs during decommissioning phase). Increase in labour costs for other sectors due to labour draw down.	Contractor management plan/ SLP: Construction safety record keeping and complaints register. Procurement record keeping. Align unskilled wages to other sectors (agriculture) in the local economy. Detailed measures as per final mine closure plan and SLP one year before closure.	Monthly update of record keeping.	Monthly reporting of contractor to client. Feedback to community on a quarterly basis.	Project Manager	Construction phase (proposed ventilation shafts), operational phase and throughout decommissioning phase
		Community investment funds (LED projects), Local economic diversity, Termination of projects and funds during decommissioning phase.	Establish programmes/ indicators as per SLP. Detailed measures as per final mine closure plan and SLP one year before closure.	As per SLP	Annually	Mining SLP and Mineral Charter Manager	Operational phase and decommissioning phase
		Local resource use	Develop a Resource Management and Monitoring Plan: Water quality standards as per the Groundwater/ Surface Water reports/ WUL. Water and energy use reduction as per operational targets.	Monthly update of record keeping.	Annually	Specialist-SHE: Environment & Environmental Practitioner	Operational phase
Archaeology, Heritage and Palaeontology	Proposed Ventilation Shafts, Underground Bord and Pillar Mining	Chance Findings of Heritage Resources, Impact on Historical Remains	Establishment of a complaints register.	Register: Continuous	Adhoc feedback on complaints register.	Land and Right Department (SMRD)	Construction phase (proposed ventilation shafts), operational phase and throughout decommissioning phase
Topography	Underground Bord and Pillar Mining	Surface deformation/ subsidence	Detailed topographical survey	Every 2 years during Operational Phase; Every 5 years later phases	Every 2 years during Operational Phase; Every 5 years later phases	Survey Manager	Operational phase; Decommissioning and Post Closure phase

Table 7(a): Formal Compliance Monitoring and Performance Assessment Programme



Environmental Component	Source Activity (ies) at Shondoni Colliery	Impacts Requiring Monitoring	Functional Requirements for Monitoring	Frequency of Monitoring Implementation	Reporting Frequency	Responsible Person	Time Period for Implementation
	Topsoil Stockpiles	Soil Quality/ Fertility	Soils should be sampled and analysed for at least the following parameters: pH (H2O), Phosphorus (Bray I), Electrical Conductivity, Calcium mg/kg, Cation exchange capacity, Sodium mg/kg, Magnesium mg/kg, Potassium mg/kg, Zinc mg/kg,Clay Organic matter content (C %)	Annually during operational phase	Annually	Specialist-SHE: Environment & Environmental Practitioner	Operational phase
Soils, Land Capability and Land Use			Monitoring should always be carried out at the same time of the year and at least six weeks after the last application of fertilizer.				
Soils, Land Capability and Land Use Geology and Geochemistry Groundwater	Re-instated Soils	Soil Quality/ Fertility	Soil Quality monitoring should be carried out to accurately determine the fertiliser requirements that will be needed. Additional soil sampling should also be carried out on the re-instated soils as required until the levels of nutrients are at the required levels for sustainable growth.	During the decommissioning/ rehabilitation phase	With each monitoring event	Specialist-SHE: Environment & Environmental Practitioner	Decommissioning and Post Closure phase
Geology and Geochemistry	Underground Bord and Pillar Mining	Potential AMD formation	Monitoring of water qualities within the underground mine and adjacent aquifers.	Quarterly	Yearly	Specialist-SHE: Environment & Environmental Practitioner	Operational and Post-Closure phase
Groundwater	Underground Bord and Pillar Mining	Depletion of external users' groundwater resources, fountains and baseflow due to bord and pillar mining activities.	Monitoring of water levels and groundwater qualities within the underground mine and adjacent aquifers as per the functional requirements stipulated in the IWWMP and approved/relevant WUL conditions.	Quarterly	Yearly	Specialist-SHE: Environment & Environmental Practitioner	Operational through to post- Closure phases
	Proposed Ventilation Shafts		Surface Water Quality should be monitored as per the functional requirements stipulated in the IWWMP and approved/relevant WUL conditions.	Weekly during construction phase	Weekly during construction phase	Specialist-SHE: Environment & Environmental Practitioner	Construction phase
Surface Water	Operations of Shondoni Colliery	Surface Water Quality	Surface Water Quality should be monitored as per the functional requirements stipulated in the IWWMP and approved/relevant WUL conditions. Record water level of the dams and flow of the streams. Continuous monitoring of a non- compliance activity must be carried out until it can be proved that the impact of the non- compliance activity is of an acceptable level.	Monthly sampling (or as determined by non- compliance activity/ incident report recommendations/ WUL conditions from DWS). Recording of dam levels and flow of streams on monthly basis.	Quarterly	Specialist-SHE: Environment & Environmental Practitioner	Operational phase



Environmental Component	Source Activity (ies) at Shondoni Colliery	Impacts Requiring Monitoring	Functional Requirements for Monitoring	Frequency of Monitoring Implementation	Reporting Frequency	Responsible Person	Time Period for Implementation
Terrestrial Ecology (Plant Life)	Proposed Ventilation Shafts		Two baseline data plots (10m x 10m) within the future impact footprint to determine pre- construction diversity and set restoration objectives. Determine each species in the plot and cover abundance of each species. Data collection during flowering season (surveys in Oct / Nov and Jan / Feb). Monitoring by an external botanist (SACNASP registered) with experience in restoration ecology and knowledge of Highveld flora.	Optimal flowering periods (Sep / Oct and Jan / Feb)	Before construction of ventilation shafts.	Specialist-SHE: Environment & Environmental Practitioner	Before construction of ventilation shafts.
		Natural Habitat	After ventilation shafts have been decommissioned, establish new plots (10m x 10m), collect data using same survey method. Additional data to be collected - presence of seedlings (recruitment) and proportions of flowering / fruiting individuals. Measure restoration success against the baseline data collected prior to construction, and a similarity index to assess the progress towards the 75% species diversity restoration target.	Monitoring of establishment of indigenous species in these plots to take place twice annually for the first five years (Sep / Oct and Jan / Feb). Follow-up surveys of these plots to take place once annually from year 6 (Jan / Feb).	After decommissioning of ventilation shafts	Specialist-SHE: Environment & Environmental Practitioner	Decommissioning phase
	Areas vulnerable to invasion (topsoil, sites of disturbance)	Alien Plant Control	Inspections of areas that are vulnerable to invasion (e.g. topsoil stockpiles, sites of disturbance e.g. construction sites). Data to be collected - species that were located and eradicated, abundance of each species, control method used, and evidence of regrowth.	Weekly during construction phase; Monthly during other phases	Monthly	Environmental Practitioner	During all the phases
Terrestrial Ecology (Animal Life)	Sasol Powerlines	Avifaunal mortalities	Implement Best Practice monitoring regime. The entire length of overhead transmission lines in the project area should be walked or driven slowly by vehicle (where possible), searching all ground below the transmission lines for avifauna carcasses. All evidence of avifaunal mortality should be recorded - Abundance (number of individual carcasses located along transmission lines); Population structure (age classes, gender); cause of death (e.g. electrocution, collision). Monitoring by an external avifaunal specialist (SACNASP registered).	Four times a year, preferably three times during the period Oct – Mar (when most migratory birds of prey will be present) and once during winter. These surveys should be repeated annually for the life of the project.	Annually	Environmental Practitioner	Operational phase (powerlines present)



Environmental Component	Source Activity (ies) at Shondoni Colliery	Impacts Requiring Monitoring	Functional Requirements for Monitoring	Frequency of Monitoring Implementation	Reporting Frequency	Responsible Person	Time Period for Implementation
Aquatic Ecosystems Wetlands	Operations of Shondoni Colliery	Changes in surface water quantity, quality and aquatic habitat availability/suitability up and downstream of Shondoni Colliery	Biomonitoring should be undertaken by a qualified aquatic ecologist in watercourses upstream and downstream of Sasol activities and should be as per the functional requirements stipulated in the IWWMP and approved/relevant WUL conditions. Biomonitoring should include on-site water quality measurements, habitat integrity analysis (IHI), Aquatic macroinvertebrate sampling (SASS & MIRAI) and fish sampling (HCR & FRAI).	Biomonitoring should be conducted biannually during the wet season (November to April) and the dry season (May to October).	After each survey	Specialist-SHE: Environment & Environmental Practitioner	Operational phase and decommissioning phase
	Pollution Control Dams and Sewage Treatment Ponds	The potential acute/chronic toxicity risk posed by selected pollution control facilities in downstream ecosystems	Toxicity testing should be undertaken by a qualified aquatic ecologist in watercourses upstream and downstream of Sasol activities and should be as per the functional requirements stipulated in the IWWMP and approved/relevant WUL conditions.	Toxicity testing should be conducted quarterly.	After each survey	Environmental Practitioner	Operational phase and decommissioning phase
Wetlands	Underground Bord and Pillar Mining	Habitat integrity and Flow quantity in wetlands	Wetland monitoring must be undertaken by an experienced wetland ecologist registered at SACNASP as a Professional Natural Scientist (Pr. Sci. Nat.) in an appropriate field of practice and should be as per the functional requirements stipulated in the IWWMP and approved/relevant WUL conditions. The method detailed in the Level 2 assessment of the WET-Health Version 2	Wetland monitoring should be undertaken once a year during the summer season.	After each survey	Environmental Practitioner	Operational phase and decommissioning phase
	Operations of Shondoni Colliery	Deterioration in water quality	document (Macfarlane, Ollis and Kotze, 2020) should be applied.				
Air Quality	Access Roads, Internal Roads, Parking Areas, Man & Material Shaft Infrastructure Explosives Off-Load Area, Conveyor System, Ventilation Shafts, Topsoil/ Overburden Stockpiles, Coal Storage in Surface Bunker, Coal Stockpile and Throw-Out Area, Stonedust Dumps	Dust fall-out	Quantify dust fall-out rates at current monitoring localities. To include sensitive receptors (southwestern edge of Embalenhle, western edge of Brendan Village, homestead to the southwest of Brendan Village on the western side of the conveyor, the closest sensitive receptors to the proposed ventilation shafts).	Monthly	Monthly	Environmental Practitioner	Construction phase (proposed ventilation shafts), operational phase and throughout decommissioning phase


Environmental Component	Source Activity (ies) at Shondoni Colliery	Impacts Requiring Monitoring	Functional Requirements for Monitoring	Frequency of Monitoring Implementation	Reporting Frequency	Responsible Person	Time Period for Implementation
Noise	Current Activities	Noise	Continue with current approved noise monitoring system. Include monitoring locality at Brendan Village.	Annually	Annually	Ventilation Supervisor	Operational phase
	Proposed Ventilation Shaft	Noise	Noise monitoring at three new localities in the surroundings of the proposed ventilation shafts (inclusive of house nearest to Shondoni West Upcast Shaft). Measurements as per SANS 10328 & 10103. Each noise monitoring survey must obtain representative samples of daytime and night-time ambient noise levels. Equipment must be programmed to simultaneously log LAeq levels in a contiguous series of 10- minute intervals covering the full duration of the survey.	One survey at commencement of shaft Construction Phase; A commissioning and audit survey at completion of ventilation shaft construction; Annual surveys in the Operation Phase	One survey at commencement of shaft Construction Phase; A commissioning and audit survey at completion of ventilation shaft construction; Annual surveys in the Operation Phase	Ventilation Supervisor	Construction and Operational phase
Visual Aspects	Operations of Shondoni Colliery	Visual Aspects	Establishment of a complaints register.	Register: Continuous	Monthly feedback on complaints register. Quarterly feedback to community forum during operational phase/ monthly during decommissioning phase.	Project Manager	Construction phase (proposed ventilation shafts), operational phase and throughout decommissioning phase



8. ENVIRONMENTAL AWARENESS PROGRAMME

A description of the Environmental Awareness Plan implemented at Shondoni Colliery is provided below and addresses the following:

- Description of how the Applicant informs employees of any environmental risk which may result from their work.
- Description of the manner in which risks are dealt with in order to avoid pollution or degradation of the environment.

Shondoni Colliery operates under a Safety, Health and Environment (SHE) Management System that meets the requirements of International Organization for Standardisation (ISO) 14001:2015 and ISO 45001:2018 standards.

The objective of the Shondoni Colliery SHE policy declaration is that: "the people of Shondoni Colliery do recognize that within our core business of coal extraction by underground mining, we can have risks and impacts on the people and the environment. We commit ourselves to meet the needs of present and future generations by applying recognized SHE standards as an integral part in all our planning and decision making processes".

In general the purpose of competence and awareness training performed at Shondoni Colliery is to ensure that employees whose work has an impact on SHE receives appropriate training to enable them to:

- Realise the importance of conforming to SHE Policies and Procedures and know how to achieve the mines safety, health and environmental objectives.
- Identify SHE risks or non-conformances of their work activities on safety, health and environment.
- Familiarise employees with emergency preparedness and response requirements.
- Be aware of the potential consequences of deviation from specified operating procedures.
- Conduct their work and manage mining activities in a safe Health and environmentally responsible manner.

Training of Shondoni Colliery employees incorporates formal as well as informal/ awareness training and is based on the principle that all persons performing tasks under the mine's control, will be competent to do so as a result of training, education, skills and experience obtained.

The Induction Training Department presents all induction awareness training to employees and service providers. Training procedures considers the literacy levels of staff, responsibility, ability, language skills and risk exposures.

Awareness training (informal training) includes (but are not limited to) the following:

- Annual Induction Sasol Mining conducts an annual SHE induction for all employees. Environmental aspects and impacts are discussed during these training sessions.
- Mine specific induction: Shondoni Colliery New employees and service providers must receive mine specific induction training before any work is undertaken.
- Standard Operating Procedures (SOP's) e.g. spillages, waste management etc.
- Planned Task Observations & Planned Task Observations on high risk tasks.



- Monthly Environmental Management themes (see below) are communicated and discussed within the operation:
 - o Erosion
 - Invasive alien species
 - o Greenhouse gasses
 - o Fire breaks
 - Waste Management
 - o Littering
 - Wetlands/ Arbor Month/ Water Week
 - Energy Saving
 - Environmental Permit to work
 - Reporting of Incidents and Non-conformances
 - Fugitive Dust
 - Environmental Impact and Aspect
 - Protection of Wildlife in Sasol Complex
 - Endangered Species
 - Hydrocarbons
 - o Dam Safety
 - o Biodiversity
- Daily SHE talks (environmental topics covered once a week, e.g. acid mine drainage)
- Continuous awareness programs
- DMRE communication
- Safe making behaviour



9. INFORMATION REQUIRED BY COMPETENT AUTHORITY

Table 9(a) serves to show that section 24(4)(a) and (b) of the Act have been adhered to when compiling the EIAR and EMPR for this project. The chapter which relays the specific information required as per the regulation is given in the second column of the Table.

In addition, an Environmental Management Programme Checklist Table (Table 9(b)) has been compiled in accordance with the guideline as set out in the EIA Regulations (GNR 326) of 07 April 2017 (as amended); Appendix 4. Table 9(b) serves to show that the Appendix guideline has been adhered to when compiling this report. The chapter which relays the specific information required as per the guideline is given in the second column of the Table.

Confirmation of the monitoring results, performance assessments, internal and external audits and the annual review of the closure plan and financial provisioning are also provided below.

Table 9(a): Section 24(4)(a) and (b) of the Act Checklist Table

24 (4)	Procedures for the investigation, assessment and communication of the potential consequ impacts of activities on the environment -	iences or
(a)	must ensure, with respect to every application for an environmental authorisation -	Section
(i)	coordination and cooperation between organs of state in the consideration of assessments where an activity falls under the jurisdiction of more than one organ of state;	N/A
(ii)	that the findings and recommendations flowing from an investigation, the general objectives of integrated environmental management laid down in this Act and the principles of environmental management set out in section 2 are taken into account in any decision made by an organ of state in relation to any proposed policy, programme, process, plan or project;	5 of EIAR
(iii)	that a description of the environment likely to be significantly affected by the proposed activity is contained in such application;	7 of EIAR
(iv)	investigation of the potential consequences for or impacts on the environment of the activity and assessment of the significance of those potential consequences or impacts; and	8 & 9 of EIAR
(b)	must include, with respect to every application for an environmental authorisation and where applicable-	Section
(i)	investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity;	7 of EIAR
(ii)	investigation of mitigation measures to keep adverse consequences or impacts to a minimum;	7, 12 of EIAR & 5 of EMPR
(iii)	investigation, assessment and evaluation of the impact of any proposed listed or specified activity on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), excluding the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act;	9, 21 of EIAR
(iv)	reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information;	15 of EIAR
(v)	investigation and formulation of arrangements for the monitoring and management of consequences for or impacts on the environment, and the assessment of the effectiveness of such arrangements after their implementation;	7 of EMPR
(vi)	consideration of environmental attributes identified in the compilation of information and maps contemplated in subsection (3); and	7 of EIAR
(vii)	provision for the adherence to requirements that are pre scribed in a specific environmental management Act relevant to the listed or specified activity in question	5 of EIAR



Table 9(b): Environmental Management Programme Checklist Table

Environmental Management Programme Guideline - Appendix 4 GNR 326 EIA Regulations 07 Apr (as amended)	ril 2017			
Headings	Section in Report			
Environmental Practitioner (EAP)				
Details of the EAP who prepared the report	1			
Expertise of the EAP				
CV of the EAP	1			
Detailed description of the Aspects of the Activity that are covered by the EMPr as identified by the Project Description	2			
Map which superimposes the Proposed Activity, its associated Structures, and Infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided including buffers	3			
Description of the Impact Management Outcomes, including Management Statements, identifying impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the developing including	; the			
Planning and Design	5			
Pre-construction activities	5			
Construction activities	5			
Rehabilitation of the environment after construction and where applicable post closure	5			
Where relevant operation activities	5			
Description and Identification of Impact Management Outcomes required for the aspects contemplated in above section	5			
Description of Proposed Impact Management Actions, identifying the manner in which the impac management objectives and outcomes contemplated in above will be achieved and must where a include actions to	t pplicable			
Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation	5			
Comply with any prescribed environmental management standards and practices	5			
Comply with any applicable provisions of the Act regarding closure, where applicable	5			
Comply with any provisions of the Act regarding financial provisions for rehabilitation where applicable	6			
The Method of Monitoring the implementation of the impact management actions contemplated in the above	7			
The Frequency of Monitoring the implementation of the impact management actions in the above	7			
An indication of the Persons who will be Responsible for the implementation of the impact management actions	7			
The Time Periods within which the impact management actions contemplated in the above must be implemented	7			
The Mechanism for Monitoring Compliance with the impact management actions contemplated in the above	7			
A program for Reporting on Compliance taking into account the requirements as prescribed by the Regulations	7			
An Environmental Awareness Plan describing the manner in which				
The applicant intends to inform his or her employees of any environmental risk which may result from their work	8			
Risks must be dealt with in order to avoid pollution or the degradation of the environment	8			
Any specific Information that may be required by the CA	9			



10. UNDERTAKING BY EAP

10.1. CORRECTNESS OF INFORMATION IN REPORTS

I, René Wolmarans, duly appointed by Sasol Mining (Pty) Ltd in terms of the provisions of the National Environmental Management Act, Act No.107 of 1998, and the EIA Regulations, GNR 326 of 07 April 2017 as amended, as the EAP managing this application, hereby confirm that as far as my knowledge goes, the information provided in the EIAR, the EMP, as well as the supporting Specialist Reports are correct.

10.2. INCLUSION OF COMMENTS AND INPUTS FROM I&AP'S

I, René Wolmarans, duly appointed by Sasol Mining (Pty) Ltd in terms of the provisions of the National Environmental Management Act, Act No.107 of 1998, and the EIA Regulations, GNR 326 of 07 April 2017 as amended, as the EAP managing this application, hereby confirm that I&AP's were provided with all the relevant information for review and consideration and that all inputs and comments received from them, were duly considered and where practicable, included in the EIAR and EMP.

10.3. INCLUSION OF INPUTS AND RECOMMENDATIONS FROM SPECIALIST REPORTS

I, René Wolmarans, duly appointed by Sasol Mining (Pty) Ltd in terms of the provisions of the National Environmental Management Act, Act No.107 of 1998, and the EIA Regulations, GNR 326 of 07 April 2017 as amended, as the EAP managing this application, hereby confirm that all inputs and recommendations from Specialist Reports, including but not restricted to baseline descriptions, impact significance ratings, proposed impact management measures, as well as monitoring proposals, were duly, where practicable, included in the EIAR and EMP.

10.4. ACCEPTABILITY OF THE PROJECT IN TERMS OF EIA AND EMP

I, René Wolmarans, duly appointed by Sasol Mining (Pty) Ltd in terms of the provisions of the National Environmental Management Act, Act No.107 of 1998, and the EIA Regulations, GNR 326 of 07 April 2017 as amended, as the EAP managing this application, hereby state that in terms of the findings of the EIAR and the recommendations made in the EMP, and accepting that the EMP will be implemented as documented, the project is acceptable from an Environmental Impact perspective.

Respectfully submitted

René Wolmarans (Pr.Sci.Nat.; Reg. EAP (EAPASA)) on behalf of JMA Consulting (Pty) Ltd



END OF EMPr



APPENDIX 3(A)

Large Scale Composite Site Layout Map

